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MARKET FORECAST

U.S. Systems Integration
Market Forecast

1993-1998

U.S. Systems Integration Program



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U.S. Systems Integration Market Forecast

1993-1998

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Abstract

Systems integration has recovered from the sluggish growth rate during 1992 and early 1993, and by 1994 should move into the double digit range once again. The compound annual growth rate for expenditures in the SI market will reach 14% for the period from 1993 to 1998. In a number of vertical markets, the growth rate will be considerably higher. The surge in SI growth is fueled by increasing reliance on SI vendors to provide advice on the use of new technology as well as advice on business planning and particularly re-engineering. A number of leading SI vendors are responding to this situation by expanding their capabilities to meet corporate needs.

This report analyzes the issues and trends changing the SI market, resulting in favorable forecasts of growth through 1998. The report discusses market activities and forces as well as types of opportunities that are emerging. A review is also made of conditions and selected, recent vendor activity in the 15 vertical markets INPUT tracks.

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U.S. Systems Integration Market Forecast, 1993-1998

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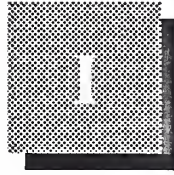
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Introduction

A

Overview

The expanding use of systems integration (SI) is creating opportunities not all vendors in this delivery mode have embraced. The expansion in use covers a wide range of information technology (IT) services and products as illustrated in Exhibit I-1.

- Many large to midsize corporations report they use SI vendors for key advice on the use of and planning for IT, as well as for services to implement IT systems. This aid may be incorporated in a project or supplied in a separate consulting assignment.
- SI vendors provide advice on major business problems and possible solutions as well as IT services to implement solutions. This advice can be provided as a consulting task that will lead to an SI assignment.
- The methodologies and project management techniques of SI vendors are used or emulated by many large companies. This knowledge may be imparted during assignments or gained through education and training from the vendor.
- SI vendors recommend and/or influence the use of hardware, network alternatives, along with software and professional services to expand IT capabilities as well as solve business problems.

- SI vendors are used to coping with the introduction of newer IT developments from imaging systems to object-oriented technology, including the spread of client/server technology. For many users, the vendors are thought of as an agent of change.
- SI vendors are beginning to exercise a major role in business planning. They are the fastest growing group of vendors in regard to business process re-engineering (BPR), and now provide more consulting for BPR than traditional management consulting firms.
- Vendors who outsource application systems operations at major corporations have SI capabilities available to accomplish the outsourcing.

EXHIBIT I-1

Expanding Role of IS Vendors Beyond Integration Projects

Use Identified by Clients	Average Importance to SI Users*
Advice and planning for IT use or expansion	4.2
Advice on business problems and targets for IT applications	4.1
Aid with planning of the use of new IT technology	3.9
Recommendations for product and services beyond specific projects	3.8
Aid in business planning including planning for re-engineering	3.7

*5 = high, 1 = low

The growth of services has enabled leading SI vendors to maintain a high rate of growth and convince major corporations they are the experts who should be consulted in regard to IT usage and plans.

The growth rate enjoyed by leading SI vendors such as Andersen Consulting and EDS, has also created a very competitive situation. Many professional services vendors and consultants are trying to offer or expand their SI services in order to participate in the growth pattern of leading SI vendors or gain a bigger share of SI revenues. However, some issues relevant to the SI market are being overlooked by these competitors.

Established SI vendors, as well as new ones, have to be constantly exploring new areas of opportunities to maintain growth rates.

- Well planned selections of new products and/or services can help them to maintain their growth and margins, but poor or no planning might result in a serious loss of market share.
- Vendors who wish to enter or expand their activities in the SI field should be concerned about the level of capabilities they must have to be successful. Limited capabilities could result in fewer opportunities to be considered for large SI jobs by major corporations. The jobs that were available might have been the more competitive ones where margins were lower.

B

Purpose and Methodology

1. Purpose and Scope

This report will review the growing use of SI, and the competition that has emerged, as noted above. Information will also be provided on the size of the market and its growth, and an analysis will be made of user issues and trends that are fueling opportunities. Consideration will also be given to vendor strategies and plans, as well as the planning considerations that vendors now face in this marketplace.

The analysis of user issues and trends will address specific needs of users as well as general issues that influence expenditures and contracts including:

- The impact of client/server (C/S) use. Users are now seeking assistance from vendors who know how to plan expansion of C/S technology, have knowledge of workstation development tools and are aware of major C/S issues, such as direct access to corporate databases and three-tiered solutions for the use of corporate data.
- The intensity of competition shown in pricing strategies and techniques of eliminating competitor consideration.
- The changing role of users, including functional user initiation of large IT projects or BPR and other management planning that can have a large-scale impact on the use of SI.
- Shortages of higher-level technical skills needed to address more complex client/server, imaging and network projects.

Vendors report their responses to these issues are having a significant impact on marketing efforts, products and services offered, along with revenues and earnings. This report will address these issues and the responses of vendors through an analysis of business and technological factors driving or inhibiting user expenditures.

This report is part of a series of market analysis reports written each year by INPUT on key segments (delivery modes) of the U.S. information services industry, which are described in Appendix A.

2. Methodology

The material used to prepare this report includes data and ideas on the SI market obtained from surveys of more than 2000 organizations. They were surveyed in relation to their expenditures and plans for information services. Further surveys performed in support of custom consulting provided additional details. Information was also obtained from more than 1000 contacts with vendors regarding their experiences in the IT marketplace. The information has been used in this report to:

- Develop five-year forecasts, an assessment of market drivers, analysis of competitive trends and identification of leading vendors.
- Assess trends and events within U.S. business, the U.S. information services industry and the SI delivery mode to provide a comprehensive foundation for understanding directions in this delivery mode and the resulting impact on vendors.

C

Report Organization

This introductory chapter of the report is devoted to describing its purpose and organization as well as indicating the general business and other trends that are having major impacts on the SI market.

Chapter II analyzes the needs, technological factors and key issues and trends that are driving or inhibiting user expenditures for SI.

Chapter III provides a five-year forecast for the growth of SI and its submodes as well as analyses of the growth of SI services. The growth of SI business for vendors and their current market shares is also analyzed in this chapter.

Chapter IV analyzes the use of SI by vertical market and lists examples of SI contracts by market, the major players and their market shares and describes competitive positioning.

Chapter V lists findings and conclusions and makes recommendations for SI vendors based on this study.

D

Background Information

1. Business Trends

The general business trends of importance for this study are indicated in Exhibit I-2.

- The major trend having an impact on the use of SI during the last year has been the low-rate growth of the economy and resulting economic uncertainty. This had an adverse impact on the market during 1992 and early 1993, but the economic picture improved during 1993 and plans for the use of SI have resumed their growth pattern.
- The general trend for the reduction of defense expenditures began to have an impact on SI in 1992 and will continue to have an impact through 1998.
- Despite the impact of the federal DoD market, commercial demand for SI services will be strong enough to cause the CAGR for SI to reach 14% for the five-year planning period.

EXHIBIT I-2

General Business Trends Affecting Use of SI

Trend	Average Importance to SI Vendors*
Slow recovery and growth of economy through early 1993	4.4
Pick up in economy in late 1993	4.2
Reduction in defense expenditures	4.1
Increasing global and local business competition	4.1
Greater dependence on technology	3.8
Restructuring and re-engineering	3.7

*5 = high, 1 = low

Three of the trends noted in Exhibit I-2 will have very positive impacts on the use of SI.

- Increasing global and local competition. This has driven many companies, and particularly manufacturers, to call upon SI and other information services vendors to improve the quality of their products or services as well as the quality of their customer service and ordering systems.
- Greater dependence on technology. This has included the expanding use of IT such as client/server, imaging, and new network capabilities as well as the greater use of automation in manufacturing, distribution and other processes.
- Restructuring and re-engineering including BPR. Steps taken to achieve BPR goals are being achieved principally by large SI firms.

2. Selective Recovery

There are negative trends shown in Exhibit I-2, such as a low rate of growth and increasing costs that are inhibiting some user expenditures for information services. These negative trends, as well as the positive ones just discussed, are having a selective effect on different vertical markets in the economy. For example, SI projects are expanding more rapidly in the telecommunications and process manufacturing markets than in previous years due to increasing business and the need for further automation. Some segments of discrete manufacturing are experiencing a lower level of growth due to reductions in defense and other business.

3. Business Restructuring/Re-engineering

A number of users report attempts to reduce costs, improve the quality of goods and services and/or achieve corporate objectives or values, has led to the realization that restructuring or re-engineering of business processes must first take place. The idea of re-engineering processes has achieved such popularity that a

business book on the subject (*Re-engineering the Corporation*) became one of the best selling books in the U.S. in the summer of 1993, and the government began talking about re-engineering its operations by September.

- Some consultants, such as McKinsey and Bain and others, feel BPR is nothing more than the intensive business systems consulting they have always carried out. It has just become more recognized as a need.
- Other consultants, including the authors of the book mentioned above, feel BPR has been evolving and must be studied before being used, because most companies and vendors talking about it are not using the technique correctly.

In addition to the actions outlined above, users and vendors report interest in BPR has also emerged from the growing use of client/server technology and imaging because the use of these technologies can encourage changes in existing processes. The rising interest in BPR emerging from the use of technology and from planning about restructuring has proceeded like a chain reaction in some organizations as was shown in Exhibit I-1

BPR has quickly become a major concern for management consulting and SI vendors.

- Management consultants such as McKinsey and Bain are using their past experience to meet the surge of interest in BPR arising in U.S. corporations. Big 6 and SI firms have also responded to the need for BPR consulting.
- The use of BPR consulting is also leading to a number of large IT projects, and major SI vendors including Andersen Consulting, EDS and CSC are increasing revenues from the implementation of these projects.

BPR is having a considerable impact on many companies, particularly larger ones, which is resulting in a significant amount of work for information services vendors. The steps taking place before the use of IT include strategic consulting, analysis of operating process strategy, change management, and technology strategy.

- Since these steps involve intense activity within a company, there may be less consideration of IT alternatives than would be the case under normal bidding considerations.
- The consultant or SI vendor carrying out the BPR activities may easily become the implementation vendor or may be influential in determining who will carry out the project.

There is also an assumption that implementation will be done by an SI vendor, although many larger professional services vendors, particularly those with SI capabilities, could handle implementation activities. Vendors interested in projects that result from BPR will have to gain more acquaintance with the technique and possibly seek alliances to obtain work.

4. Other Trends

In addition to technological and business trends, other trends affecting the use of SI services include the use of SI vendors to aid in the expansion of client/server systems and the increasing use of SI vendors in place of central IS resources in the support of IT projects throughout organizations.

E

Related Reports

Systems Integration in State and Local Government

Systems Integration in Health Services

Systems Integration in Discrete and Process Manufacturing

Desktop Systems Integration Opportunities

Systems Integration Technologies

Systems Integration Vendor Profiles

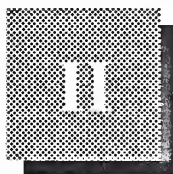
U.S. Outsourcing Markets, 1993-1998

European Systems Integration Markets, 1993-1998

Procurement Approaches to Systems Integration-Europe

*Client / Server Impact on Major Project Contracting-Europe,
1993-1998*

*Applications Driving Systems Integration Projects-Europe,
1993-1998*



Systems Integration Environment

A

Factors Driving Use of Systems Integration

1. Overview

Both SI vendors and users report there are certain factors likely to encourage the use of systems integration (SI). Several vendors reported they consider these factors in order to predict the likelihood of SI contracts.

- A group of factors are related to user needs and issues, whereas, others are more general or technological in nature.
- Several of the factors are sufficiently important to users to make them evaluate vendors based on their capabilities in relation to the issues involved.

The following material discusses these factors in regard to user needs and other issues.

2. User Needs/Issues

As shown in Exhibit II-1, the primary reason that encourages the selection of an SI vendor, is the need to solve problems associated with complex and/or large scale business processes such as materials management in manufacturing or utilities or commercial loan administration in banking.

EXHIBIT II-1

Needs/Issues That Drive Use of SI

Needs Reported	Average Importance*
Solution involving complex industry processes	4.1
High level of connectivity	4.0
Need to steer client/server plans	4.0
Use of key new technology	3.8
Restructuring of re-engineering	3.7
Vendor skills can solve application problems	3.5

*5 = high, 1 = low

- There are certain processes in each industry or vertical market that have become prime targets for SI solutions. A group of major SI vendors are continually analyzing other processes in order to identify the potential for new solutions in markets of interest.
- If an SI vendor identifies and provides a new or upgraded solution for a complex process, other organizations in the same industry are usually interested in this solution as Andersen Consulting illustrated with its recent solution to the process of reconciling ticket sales and ticket usage.

Only a small number of firms trying to increase their SI business are intensely active in this type of research, but they are vendors with large volumes of SI work, in general.

Among other needs and issues that drive the use of SI are high levels of network usage and/or connectivity between offices or processes in a company as noted in Exhibit II-1.

- This was reported to be the case in large-scale order entry and trading and manufacturing projects handled by SI vendors.
- Users report only a few SI vendors were prepared to meaningfully discuss their network needs, however.

The likelihood that new technology, particularly network technology, will be required to solve application problems is reported to be a major need that will demand an SI solution.

- An energy company and two large banks that have installed imaging systems were among the organizations that felt SI was required to deal with new technology.
- Several manufacturing concerns noted the expertise of SI vendors was needed to deal with their uncoordinated growth of client/server systems.

The need for re-engineering of business processes was also identified as a sign that systems integrators would be needed to accommodate the changes to or replacement of existing systems.

Finally, an argument for the use of SI vendors to solve an application problem is a desire to rely on the specialized skills of SI vendors rather than add specialized internal personnel for projects. This was mentioned as a project-related need or issue, but is closer to the use of SI. These factors are listed in Exhibit II-2.

- One of the key factors favoring SI vendors is their reputations for implementing a solution rapidly compared to other types of information services vendors or internal IS groups.
- Another related factor is that SI vendors are credited for their knowledge of business problems and means of solving them. When there are questions regarding the solution of business problems, users, particularly at larger companies, are inclined to seek the opinion of a recognized SI vendor.
- SI vendors are reported to be favored by users in some situations because internal IS groups and users have not agreed on the planning approach for solving problems. IS tended to recommend longer term approaches that would have permitted a more systematic upgrade of IT equipment, whereas users favored more *ad hoc* approaches.

EXHIBIT II-2

General Factors That Drive Use of SI and Vendor

Factor	Average Importance*
Expectation of more rapid solution	4.3
SI vendor's knowledge of industry solutions	4.2
Problems in internal IT planning	4.0
Pace of change in IT technology	3.8
Vendor experience with new technology	3.7

*5 = high, 1 = low

Illustrating the fact that the use of new technology is a major issue, users noted SI vendors were also desirable due to their experience in implementing new technology.

3. Technological Factors

The specific technology that is important in the SI environment and has an influence in the use of SI is shown in Exhibit II-3.

- Client/server technology is mentioned most often since many users are concerned about planning or coordinating the rapid introduction of client/server units in their departments or companies.
- Network technology, including the use of LANs, WANs, asynchronous transfer mode and ISDN, is also a leading factor in the use of SI.

EXHIBIT II-3

Techniques Affecting the Use of SI

Factor	Average Impact*
Client/server expansion	4.3
Network expansion and improvement	4.2
Support for distribution	4.0
Open systems	4.0
Imaging systems	3.6
Object-oriented technology	3.4
Multimedia	3.0
Artificial intelligence	2.4
Use of small portable and "Newton" types of products	1.8
Parallel processing	1.5

*5 = high, 1 = low

Few users feel they have an adequate understanding of the network capabilities recommended or discussed for use to support business and systems plans. They feel a need for further presentations and consulting aid from many types of vendors, including chiefly hardware vendors. However, the tendency among larger firms is to call on vendors recognized for SI capabilities.

Other technology having an influence on the use of SI includes a means of handling distributed systems, open systems and imaging. Several users noted they had decided to use SI vendors, rather than technological leaders, to implement imaging systems because these vendors knew how to plan for change and possible restructuring or re-engineering of processes that could be caused by new technology.

Object-oriented software, as well as multimedia technology, are viewed as capabilities that users expect to use in the future. Users also expect leading SI vendors to be able to aid them with these technologies.

Other technologies, including the use of personal assistant products and parallel processing, were mentioned infrequently, but recognized as being possible SI vendor-related topics. SI vendors are seen as general sources of aid with technology that will be useful in business.

4. Impact of Client/Server Technology

The most visible technological impact on the systems integration environment is from the use of client/server systems as illustrated by Exhibit II-4.

- Users with or without the aid of an IS group have been downsizing and moving work to client/server platforms as well as seeking aid and training in client/server systems.
- Users and IS groups may be engaged in developing and modifying applications for client/servers and/or obtaining client/server tools.

EXHIBIT II-4

Impact of Client/Server Technology

Impact of Technology on Users	Average Importance to Users*
Downsizing or moving work to client/server platforms	4.6
Developing and modifying applications for client/servers	4.2
Obtaining client/server tools	3.8
Addressing network problems re: client/server use	3.7
Seeking further training for client/server technology	3.7
Seeking technical aid with client/server use	3.6

*5 = high, 1 = low

SI vendors will find almost any assignment they win involves the use of client/servers as part of the environment or the solution.

- Users may have undocumented client/server applications handling work involved in business processes that are being changed or automated. It may be necessary for SI vendors to review client/server use and present seminars on the topic in conjunction with major projects.
- In many situations, the solution to a business problem may require client/server systems in departmental locations even if mini or mainframe platforms are handling heavy processing loads.

B

Key Issues and Trends

1. Driving Forces

The reasons for SI projects are reported to be classic business goals such as additional revenue as shown in Exhibit II-5.

- Increasing revenue and productivity or providing better service still lead in SI activities benefits.
- Supporting the re-engineering of processes or limited restructuring of organizations is also important in justifying projects. System changes to support the reduction of personnel through downsizing programs are of high importance, as well.
- Projects are also driven by the need to fix or upgrade existing technology or business systems. These actions can provide savings over a period of time if not immediately, and they also can guard against problems that might occur in future expansion or replacement of IT facilities.

EXHIBIT II-5

Driving Forces Justifying SI Use

Force	Relative Importance*
Increase revenue	4.1
Increase service	4.0
Improve quality	4.0
Support re-engineering, restructure or downsizing	3.8
Straighten out use of IT	3.5

*5 = high, 1 = low

2. Inhibiting Factors

There are definite factors that have inhibited the use of SI according to respondents.

- As Exhibit II-6 indicates, uncertainty in business planning is a key inhibitor having more of an impact than budget limitations.
- The uncertainty may be related to the discontinuation or sale of product lines or other major business changes. Corporate acquisitions and mergers may also be reasons to suspend consideration of SI.

EXHIBIT II-6

Inhibiting Factors

Factor	Relative Importance*
Uncertainty in corporate planning	3.9
Budget limitations	3.8
Short term pressures on IS	3.4
Merger, acquisition being planned	3.3
Outsourcing being considered	3.1

*5 = high, 1 = low

Short-term pressures for system changes to overcome problems affecting business or handling changes in business, can cause delays in considering the use of an SI vendor to handle major new projects.

- A series of changes may delay SI projects for lengthy periods, according to some respondents. In some cases, an IS manager may argue that the ability to produce immediate improvements and payoffs in business can be delayed by the initiation of large-scale SI projects.
- Several SI vendors noted they try to include near term changes to address current problems into SI projects in order to overcome this situation.

The leading trend, recognized by users in relation to SI, is an increasing use of this delivery mode as shown in Exhibit II-7. The increase may include projects where an internal group is in charge of, or shares direction of, SI projects.

EXHIBIT II-7

Trends in SI Use

Trends Identified on Users of SI	Average Importance*
Increasing use of SI	4.0
Increasing reliance on SI	3.8
Certain SI vendors are being associated with changing IT	3.7
Regular contact and advice from SI vendor	3.7
More vendors claiming to have significant SI strength	3.5

*5 = high, 1 = low

The increase in SI use has been accompanied with increased contact from firms promoting their SI capabilities (chiefly professional services or consulting vendors). These firms are concerned with both gaining SI contracts and not being excluded from consideration for large jobs.

Users also feel there is a trend for increasing reliance on SI vendors for technical skills as well as knowledge of industry applications. SI vendors are also increasingly asked for advice and aid with new IT technology and the changes that will be necessary to introduce it.

- This trend has resulted from a number of current developments including the pace of change in client/server technology and networks, workstation operating systems and new types of development tools including object-oriented products.
- One user noted an SI firm had pointed out an object-oriented database would be much more suited to an imaging application being considered by his firm. He also noted his own organization was reluctant to support ongoing IT research to keep abreast of changes and product considerations that have become involved in systems planning.

C

Vendor Competition

1. Analysis of Competition

Competition has been rapidly increasing for potential SI work. One Fortune 100 company reported that presentations on the use of SI had been recently offered not only by its IT hardware vendors, but also by: several large professional services firms, its two auditing firms, strategic consultants and three major SI vendors.

One reason for this increase in competition is the differential in rates between SI and professional services business as shown in Exhibit II-8.

- SI contracts involve commitments to achieve a solution which is priced and paid for at a higher rate than supplying capabilities to work on a time-based or task-based assignment as professional services firms do.

- Professional services vendors also compete against numerous temporary services firms, one person or small vendors offering professional services capabilities at very low prices. These vendors have increased greatly in number due to corporate personnel reductions and supplies of foreign programmers.

EXHIBIT II-8

Reasons for Increasing SI Competition

Reasons	Average Importance*
SI has a higher margin than professional services and is growing at a faster rate	4.4
Pressure on professional services billing rates from temporary services and small vendors	3.8
SI projects are more likely to lead to add-on work	4.1
SI vendors have the opportunity to stay close to new IT	3.5
SI can lead to outsourcing	3.6

*5 = high, 1 = low

There is more guarantee of obtaining a substantial amount of continuing work, as well as higher pricing, with SI contracts than with professional services work. Professional services contracts are also more likely to shrink or be subject to reconsideration if business changes or new IT technology is considered.

SI can also provide the opportunity to preclude competition in some situations. If an SI vendor becomes involved in consulting work involving re-engineering or other consulting, there is a good possibility the resulting projects will utilize the SI vendor.

- In the past, a corporation would often use one vendor as a consultant and select another vendor to implement the systems recommended. In a re-engineering situation, the knowledge the vendor has acquired can be quite valuable in implementation work.

- At the present time, corporations are interested in finding vendors they can rely on to aid with business and technological change. When a vendor can point to in-depth experience with change and has relevant technical and business knowledge, there is less likelihood that assignments will be split between vendors.

In addition to the above, large professional services firms have been trying to compete for SI business since vendors, known for their SI business, have a higher valuation in the marketplace. Mergers, acquisitions and fund raising, as well as sales of holdings, can all benefit from this valuation.

2. Selection Criteria

Pricing is an important consideration in SI competition, but is not the only factor in vendor selection as indicated in Exhibit II-9. Some of the lowest bids for an SI job are not even considered based on the vendor's lack of relevant experience or inability to convey an understanding of the industry, process or problem involved. This places considerable pressure on the demonstration of knowledge.

EXHIBIT II-9

Factors That Will Influence Use of Particular SI Vendors

Factor	Average Importance to Users*
Experience in implementation of similar systems	4.3
Proposal and discussions with vendors	4.2
Image of vendor as an agent of change	4.1
Experience with industry and application	4.1
Pricing	4.1
Guarantees, penalties	4.1
Ability to work with functional users	4.0

*5 = high, 1 = low

- SI vendors make a great effort to demonstrate their knowledge of technical and industry topics during a bidding process with presentations or even demonstrations of solutions.
- A temporary firm reported it had found personnel for a major IT vendor to use during interviews on a possible project. The personnel filled in the vendor's knowledge gaps of re-engineering and client/server software. This enabled the major vendor to demonstrate the technical competence necessary to win the job.

The most important factor in obtaining SI work is reported to be experience in delivering similar application solutions.

- This experience must be confirmed by in-depth discussions or demonstrations of solutions to the business problem(s) of concern.
- There will, however, be a trade-off between high price and demonstrable understanding of the problem.

Discussions and presentations that demonstrate industry knowledge and experience in introducing new technology, are also important in influencing buyers, as are contractual penalties and guarantees for meeting implementation dates and promised capabilities.

Another factor to be considered is the ability of vendors to work with users.

- Some professional services firms have far less ability than large SI vendors in working with user committees or executives. The SI firms take the time to train personnel to work with users.
- Benefits of working well with users go beyond just efficient project execution. Some SI vendors use their relationship with users to gain helpful information when making presentations to prospects. Some vendors also gain by ensuring the interaction with users provides an opportunity to demonstrate their understanding of the user's business problems.

3. Increasing Role of Users

Users and their management have become far more influential in determining the use of SI vendors. Their use of local IT capabilities has often expanded beyond obtaining data from the mainframe, to the point where changes to or segmentation of mainframe applications has been carried out to support their IT activities.

- This type of experience creates an environment, whereby, the user expects to be considered in the evaluation of both SI projects and vendors.
- Users or their managers may also be interested in expanding or building local IS capabilities to handle some of their needs and expect that concern to be addressed in bids.

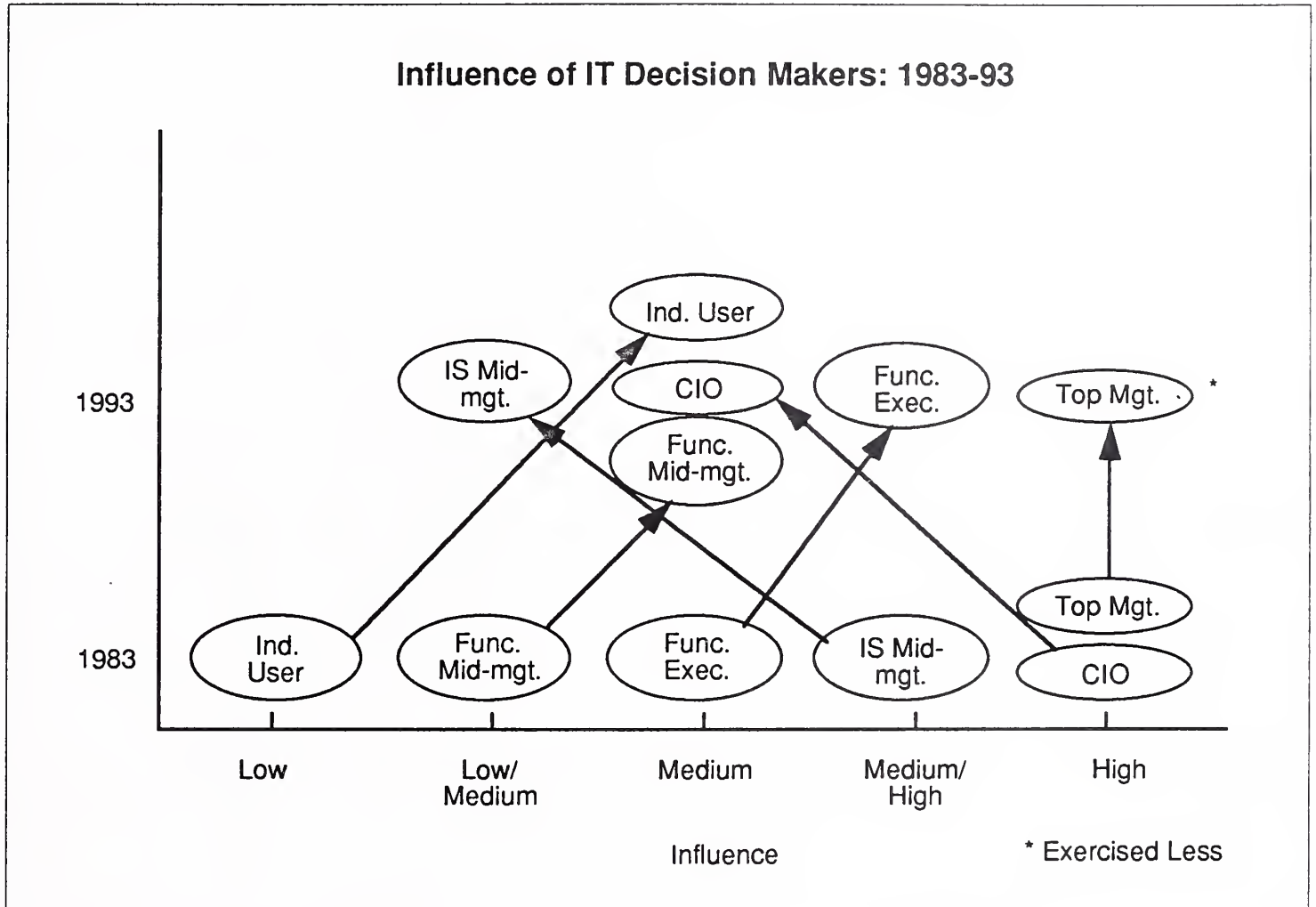
Users, functional managers and executives will not only be interested in having application problems solved. They will want to know how the problems are going to be solved, what role that they will play in the solution and what capabilities they will have to help achieve the solution.

The pressure by top management to improve corporate results is the overriding reason for the increasing power of user areas. Processes where users are involved must improve to meet these objectives. Users are pointing out or demanding changes which are necessary to bring about these improvements.

- As a result, in many companies, users report central IS managers and the CIO are less able to steer them toward a carefully planned, but slow achievement of results. Users are demanding faster planning and implementation, and they report that is what their top management wants.
- IS staff is being transferred to the user area to help users achieve corporate results in many companies.

Exhibit II-10 indicates the shift of decision-making power that has taken place in the use of IT.

EXHIBIT II-10



By 1998, the shift will result in still more power for functional managers and executives as shown in Exhibit II-11.

- Exhibits 10 and 11 illustrate that still more effort will have to be taken by SI vendors in the future to ensure they are selling user management.
- A number of IS managers will transfer to, or become much more supportive of, user business units as a result of the shift of decision-making power.

EXHIBIT II-11

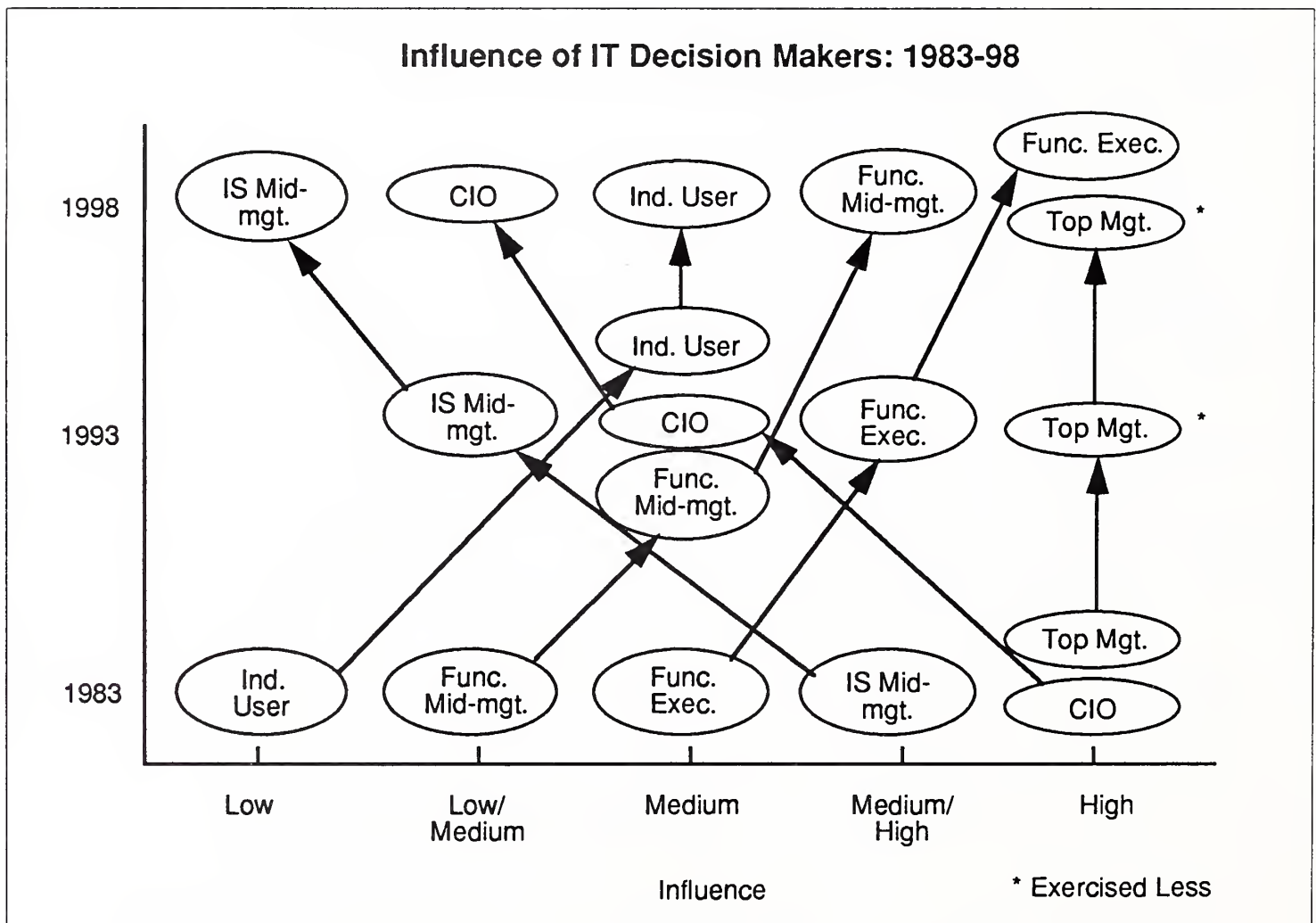
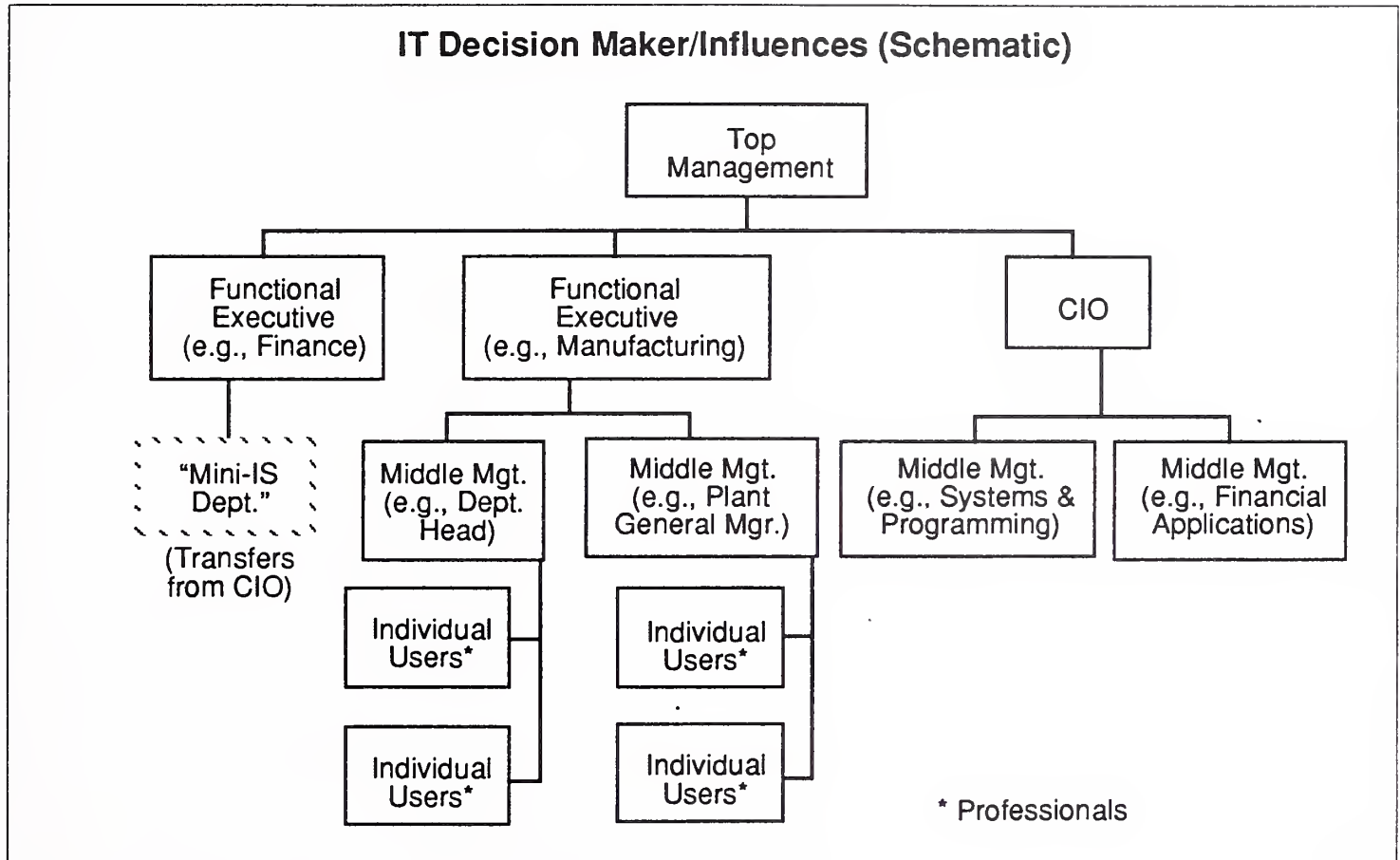
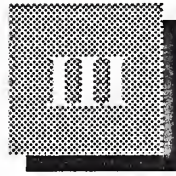


Exhibit II-12 describes or defines the roles shown in the prior two exhibits.

EXHIBIT II-12



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Market Analysis and Forecast

A

Market Overview

1. Current View of Systems Integration

Systems integration (SI) continues to increase in importance as an information service for three key reasons:

- It is growing at a relatively fast rate and generating attractive margins for leading SI vendors.
- It is a necessary offering for most computer manufacturers since SI contracts can involve the selection of computer hardware and related products.
- It is a service that tends to generate or control the use of other information services including software products, professional and network services and systems operations. In the latter case, it is often necessary to provide an SI solution before an application or systems operations is outsourced.

SI has undergone some changes since its inception but the basic service concept has not changed.

- SI is generally thought of as a vendor service which involves providing a complete IT solution to a complex business problem as described in Exhibit III-1.

- To provide the solution, the SI vendor obtains equipment, software products, software development and other services from a group of vendors. The SI vendor acts as a prime contractor by taking responsibility for the work of other vendors and receives a markup on their services.

EXHIBIT III-1

INPUT's Definition of Systems Integration

INPUT defines systems integration as a business service that provides a systems solution primarily based on information industry products and services. Most or all of the following are performed in SI contracts.

- Needs analyses
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modifications, integration and customization (includes off-the-shelf applications and systems software products)
- Software design and development
- Hardware design, development and purchase
- Systems implementation, cut-over, testing and evaluation
- Life cycle support (includes training documentation, operations and maintenance)
- Financing
- Other services

Today, the prime contractor may use allies or divisions of its own company as well as other separate, independent vendors as subcontractors. The integration of a combination of hardware, network components and software products with customization or software development is still involved. In order to implement a solution, the SI vendor may pay or pass through revenue to hardware and software vendors whose products are being utilized.

The integrator continues to take the risk and responsibility for successful completion of most SI projects, although in some cases, an internal group may play a joint or lead role in SI undertakings.

- If the lead vendor is not taking the responsibility for integration tasks, the project should not be recognized as generating SI revenues.
- Some projects classified as SI activities seem more like professional services assignments. Several SI vendors have sizable projects underway involving upgrades to COBOL programs that are reported as SI activities, although they should be classified as professional services work.

INPUT attempts to exclude the type of work described above as well as turnkey systems, robotics, automated controllers in manufacturing and embedded systems from SI classifications.

- Turnkey systems use software products that require little customization and integration work is generally done for the system being sold.
- Robots and automated controllers generally operate outside manufacturing or other information systems, but if they supply data to or are a part of any other systems, an attempt is made to incorporate project revenues in the SI delivery mode.

Systems integration work can be divided into its four components or submodes: professional services, equipment, software products and other services which can include processing as well as clerical activities.

- Systems operations is sometimes included although this is a different type of work which INPUT classifies in a separate delivery mode.

- Some vendors include all or a portion of non-IT management consulting services in SI work. INPUT also tries to separate this work because it can be performed separately from SI work by a different vendor.

2. Differences in Federal and Commercial Systems Integration Work

The classification of SI work discussed in the prior section allows work to be compared or aggregated across government and commercial sectors.

- Some federal government offices subdivide the professional services component further than most commercial users into software development, education and training, consulting, program or project management, design and documentation.
- Commercial users tend to describe SI professional services and standalone professional services alike: (i.e., consulting, software development and education and training).

Some commercial users are beginning to add the concept of application management to standalone professional services. However, this type of work could be thought of as an add-on to SI professional services work if it was included in an SI contract.

In a commercial SI job, the vendor may run down a number of possible tasks and activities to decide what will be required for a job and how it should be bid as shown in Exhibit III-2.

- Most of the activities that take place on the project can be classified under the four submodes of systems integration discussed previously.
- There can also be management consulting and information services activities, other than SI, including equipment services tasks as well as other non-IT-related activities included in the project considerations or work plan.

EXHIBIT III-2

Potential Commercial SI Project Considerations

- Strategic planning
- Requirement analysis
 - Wants versus needs
 - Functional solution
 - Feasibility
- Proposal basis
 - System architecture
 - Equipment and software
 - Delivery requirements
 - Implementation plan
 - Acceptance criteria
- Staffing
 - Project management
 - In-house staff
 - Outside skills needed
- Environment
 - Installation
 - Training
- Costing
 - Labor
 - Materials
 - Markup
- Competitive analysis
- Competitive pricing

The interests of commercial clients can vary widely from one job to another. Federal SI jobs don't vary significantly, and they have much more definite characteristics than commercial ones, as noted in Exhibit III-3:

EXHIBIT III-3

Characteristics of Federal versus Commercial SI

- More detailed requirements
- More standardized approach to SI (e.g., program office)
- More formal process
- Costly and open bidding process
- Different approach to marketing

- The federal customer usually has a more detailed set of requirements included in an RFP, and a vendor that has helped to develop those requirements will probably be excluded from bidding.
- Federal organizations establish program offices with experienced legal and technical staff members ready to administrate SI contracts. Commercial organizations are generally less prepared to administrate SI contracts and have to rely on more general and disbursed capabilities to help.
- There is a more formal process for evaluating bids and price, and the completion date and past performance are measured and compared more closely. A government agency maintains records of past performance on Department of Defense contracts. Laws also control what information can be disclosed to vendors during stages of procurement.
- The federal process and awards of contracts is more open than in the commercial sector. The requirement for competitive bidding for all jobs over \$100,000 is also unique to the federal market.

- Marketing differs greatly between these markets. Upcoming solicitations for bids in the federal market are advertised in the Commerce Business Daily. Information on major programs is available in various documents. Commercial business depends on obtaining information about possible jobs from the sales force and other types of contacts. Commercial vendors may also cause companies to consider and initiate SI projects through presentations.
- Federal bids can be costly to prepare due to the complex process. The profit from jobs is tightly controlled and limited to 15% on fixed-price contracts. The federal government can also audit vendor records. Incentive or award fees can be used, however, to improve performance or schedules.
- Commercial profits can be and are generally higher, but the specifications for a job are not as rigid, so that commercial vendors can be exposed to the risk of lawsuits over performance.
- Substantial delays can occur in the lengthy and costly federal process which can result in the need to reconsider the technology that has been bid or proceed with a solution that is not current.

Some commercial clients have incorporated aspects of the process used in the federal and state governments for SI projects to provide more protection for critical undertakings.

3. SI Market Sectors

INPUT has carried out interviews and analysis of SI business so SI can be reported in the same set of 15 vertical markets that are utilized in INPUT's Market Analysis Program (MAP). These markets are described in Appendix A in terms of SIC codes.

SI firms tend to focus on a subset of the 15 vertical markets available because each market requires an investment of time and resources.

- Prospects seek a high level of market problem knowledge and solution approaches in key application areas from prospective vendors.
- Prospects also seek a high level of experience with new technology in their market area. Vendors are forced to update their knowledge and experience rapidly when new IT developments appear.

As a result, many vendors serve only a few markets with SI services. Even major vendors, such as EDS or Andersen, do not seek business in all vertical markets.

4. Vendor Classification

Vendors in a variety of industries, from airlines to discrete manufacturing and telecommunications, have entered the SI business.

- Many of these vendors offer SI services to participate in the revenue and earnings growth of SI.
- Since SI provides a means of distributing other IT products and services, computer manufacturers as well as professional services firms have felt compelled to enter the market as well. Some professional services vendors report they could receive a higher return for their activities if they delivered them as part of an SI contract.

Since the background and interests of SI vendors differ substantially, one of the classifications of interest in analyzing this market is in terms of the business background or primary interest of the vendor as illustrated in Exhibit III-4. This classification shows SI vendors generally tend to come from the IT industry, Big 6 firms and consultants and telecommunications firms. These firms have a common interest in the use of information.

EXHIBIT III-4

Classification of SI Vendors

Type of Vendor	Examples
Computer Hardware	DEC, IBM, Unisys
Professional Services	CSC, AMS, PRC, TSC
Big 6 Firms	Anderson Consulting, Ernst & Young, Price Waterhouse
Discrete Manufacturing	EDS, BCS
Telecommunications	AT&T, GTE, Cinn. Bell
Other	AMRIS

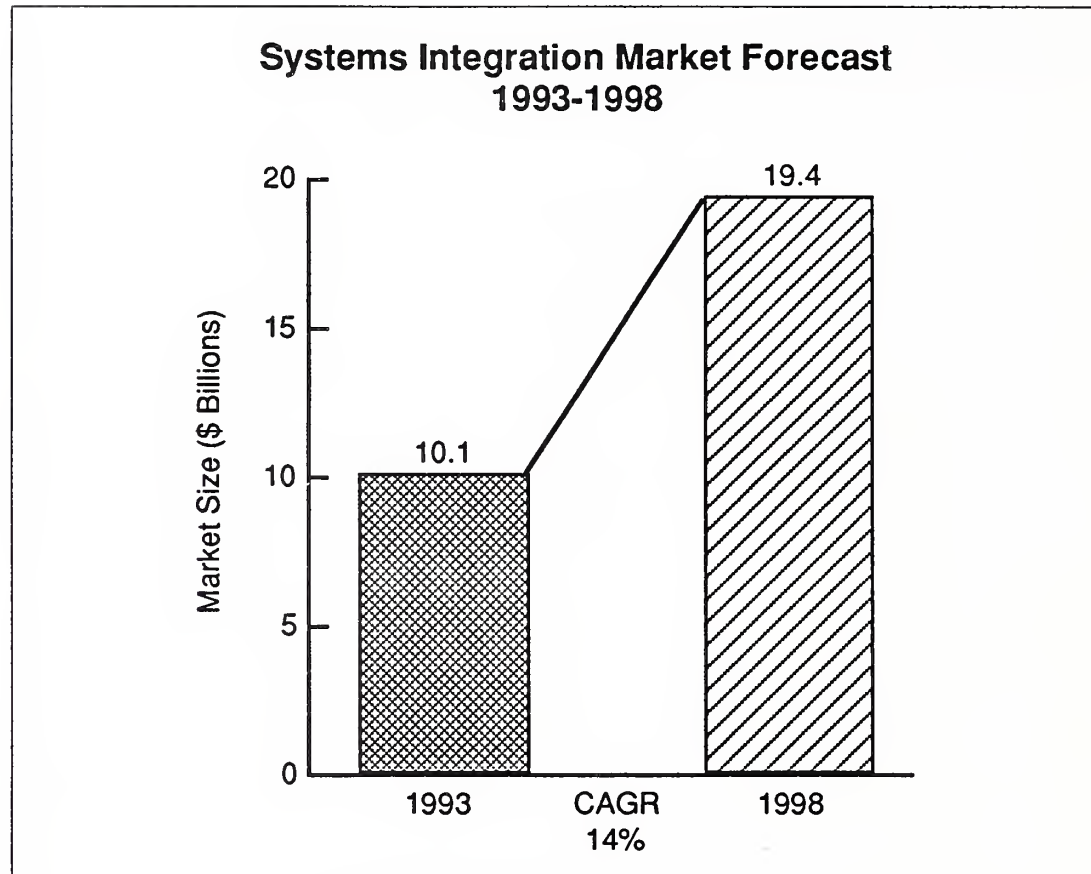
Another classification scheme for vendors would be by markets served. Most vendors specialize in a small set of SI markets. Other classifications of interest would include levels of revenue and types of tools and development methodologies utilized.

B**Market Forecast****1. Recovery of U.S. SI Market**

Due to the slow recovery from the recession during 1992 and early 1993, the SI market only showed a growth of 9% in 1993.

- However, the economy began to show more healthy signs in the second half of 1993.
- Users began to show more interest in projects that could improve their sales, earnings and productive capacity.
- Users are forecasting a more robust 14% CAGR for SI expenditures from 1994 through 1998, that will result in a level of \$19.3 billion, almost double the 1993 base of \$10 billion in expenditures as shown in Exhibit III-5.

EXHIBIT III-5



The growth of SI expenditures will be uneven however.

- CAGRs forecast for utilities, insurance, state/local government and the federal government are approximately 2% below the previous forecast as indicated in Exhibit III-6.
- Five-year CAGRs for discrete manufacturing, transportation, retail distribution and business services are within 1% of the previous forecasts.
- Increases in CAGRs over the previous five-year forecast are estimated for process manufacturing, telecommunications and health services.

EXHIBIT III-6

Change in Five-Year CAGR

Vertical Market	1992-1997	versus	1993-1998
Discrete Manufacturing	21		20
Process Manufacturing	14		15
Transportation	20		19
Utilities	12		10
Telecommunications	21		22
Retail Distribution	21		20
Wholesale Distribution	16		16
Banking/Finance	21		21
Insurance	19		17
Health Services	11		18
Education	17		17
Business Services	24		23
Federal Government	12		7
State and Local Government	21		12
Miscellaneous	N.A.		16

Growth rates are high in a number of vertical markets including discrete manufacturing, telecommunications, retail distribution, and business services where they are at least 20%. The CAGR for the full market suffered from the drop in federal government SI expenditures.

2. Commercial Versus Federal SI Markets

After a slight decrease in work during 1992, due to cutbacks in defense spending, growth of SI in the federal market from 1993 to 1998 is forecast to slip by almost 50% from the previous five-year forecast as indicated in Exhibit III-7.

- Cutbacks in defense spending are offsetting increases in areas stimulated by the new administration.

- Initiatives for reorganizing or re-engineering government, with additional spending to support changes in health care and other civilian programs, could restore some vitality to the federal SI market during 1994.

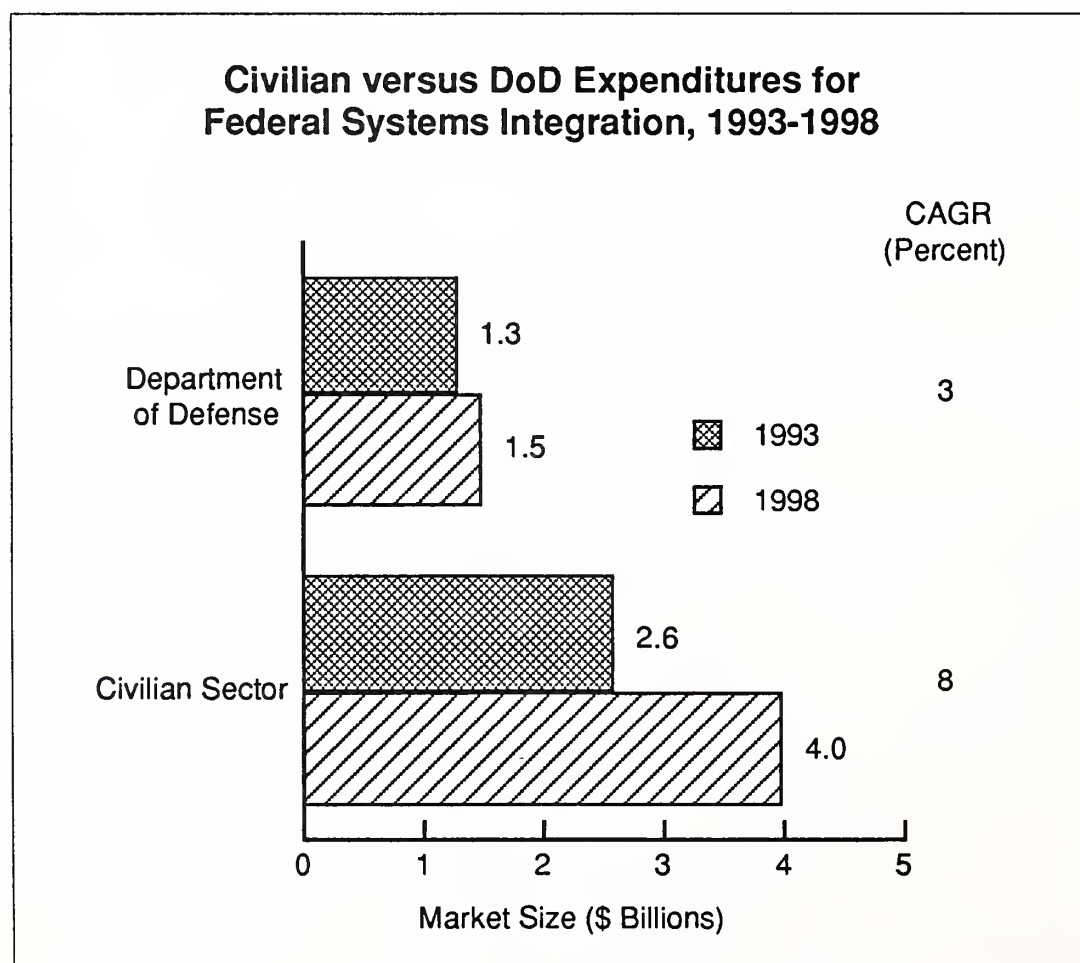
EXHIBIT III-7

Change in Federal SI Forecast

1992 Forecast:	1992 Forecast Growth 1992-1997 CAGR	12% 12%
1993 Forecast	1992 Actual Growth 1993-1998 CAGR	-1% 7%

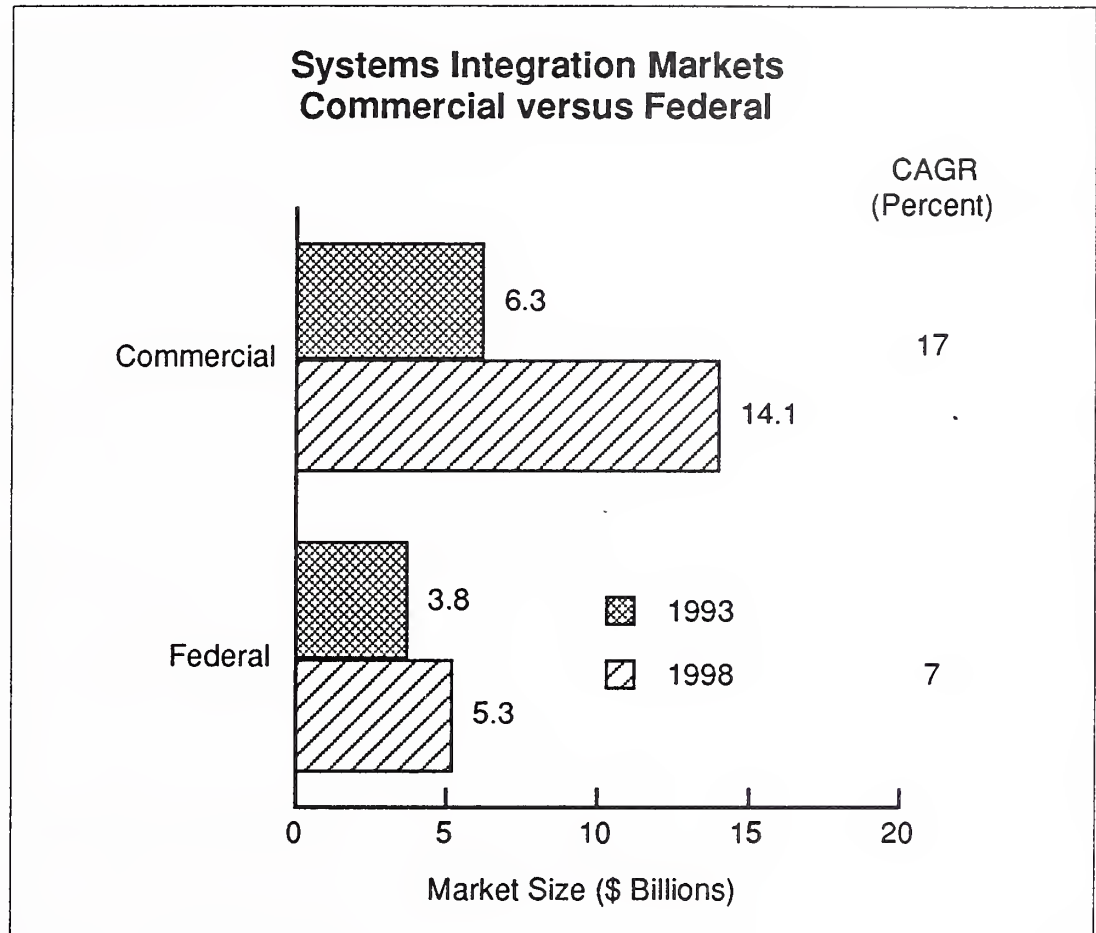
The difference in CAGRs forecast for DoD and civilian expenditures for the federal government are shown in Exhibit III-8. In early 1992, these rates were forecast to be almost equal at 11% for DoD versus 12% for civilian. By now, the rates have diverged sharply.

EXHIBIT III-8



At present, the CAGR for commercial business is more attractive than the rate for federal business as shown in Exhibit III-9. This helps explain why many SI vendors such as CSC and PRC are trying to increase their percentage of commercial work.

EXHIBIT III-9

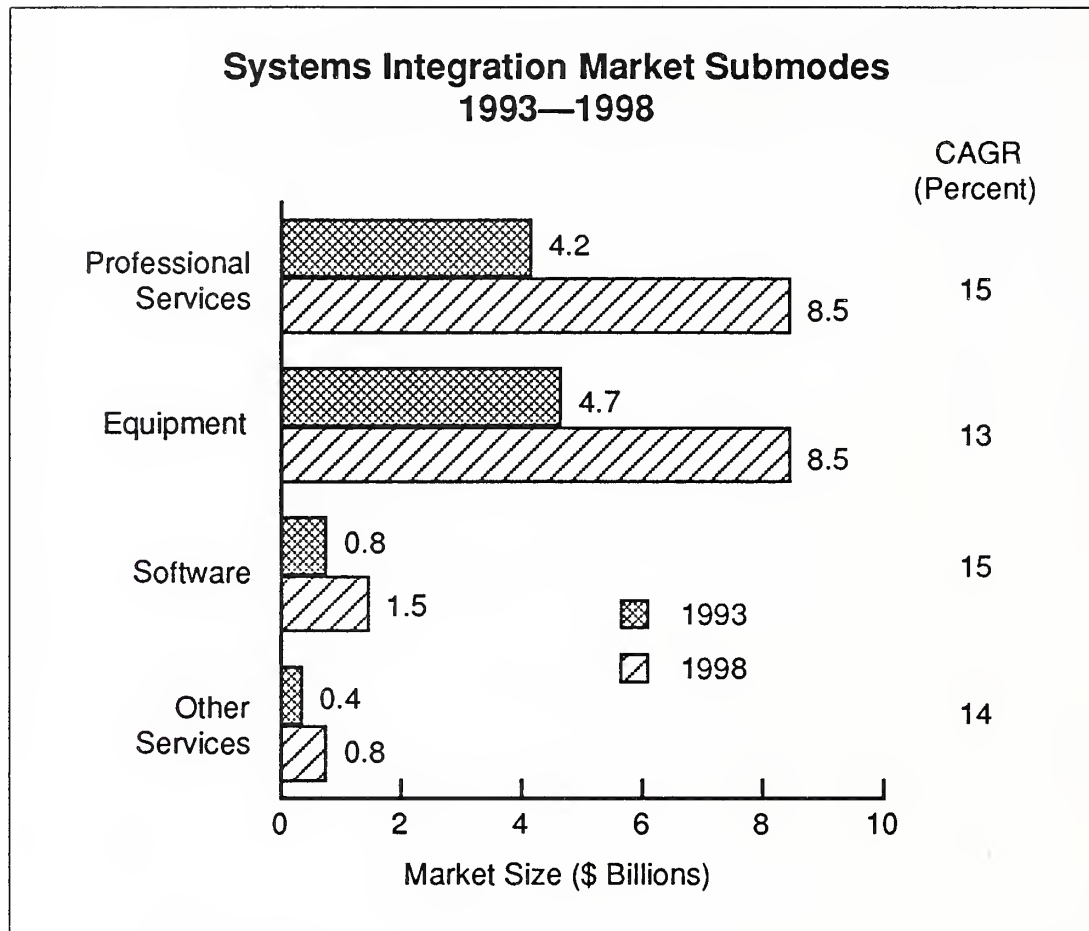


3. Forecast by Submodes

Expenditures by SI submode are indicated in Exhibit III-10. There are differences between submode expenditures in the federal and commercial markets as shown by comparing submodes as percentages of SI expenditures in Exhibits III-11 and III-12.

- In both markets, expenditures for equipment and professional services are the most significant. However, expenditures for equipment are a larger percentage in the federal government than in the commercial.
- There is not much difference in the percentages of SI devoted to software products and other services in both markets.

EXHIBIT III-10



Expenditures for equipment, computing and communications equipment is larger than other submodes in the federal government and in several commercial markets. In most commercial markets, expenditures for the professional services submode of SI is highest. This is the submode that covers the work of adapting software and hardware products to accomplish a solution.

Although software products do not add a substantial amount to the expenditures for SI projects, they can be critical elements because they may address vital parts of the solution such as MRP or materials management in manufacturing or trading systems in the finance and banking market. Many SI vendors such as Andersen Consulting, AMS and TSC have software products that are key components of solutions.

The customization or additional development needed is the professional services part of SI. The basic task of SI is to integrate existing software and hardware products and other services to achieve a solution.

Other services can include network services or remote processing as well as engineering or other non-IT services required to provide a solution.

EXHIBIT III-11

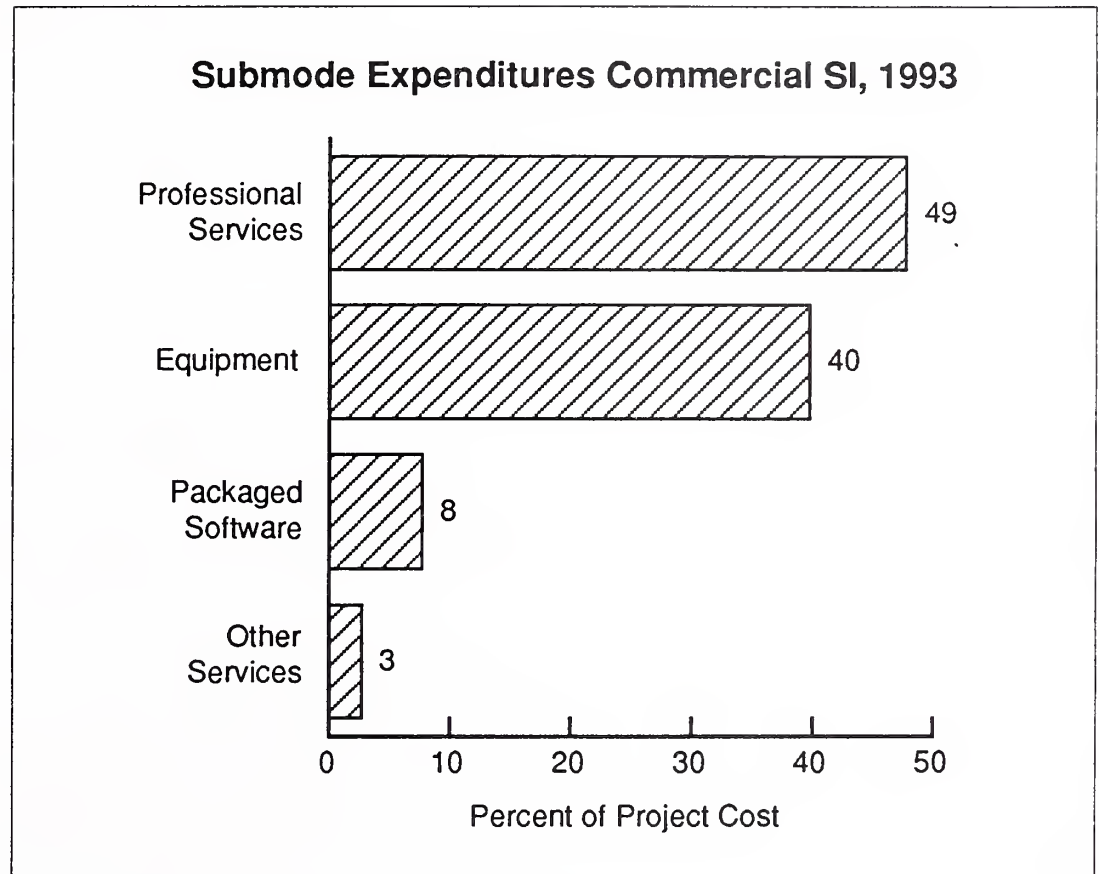
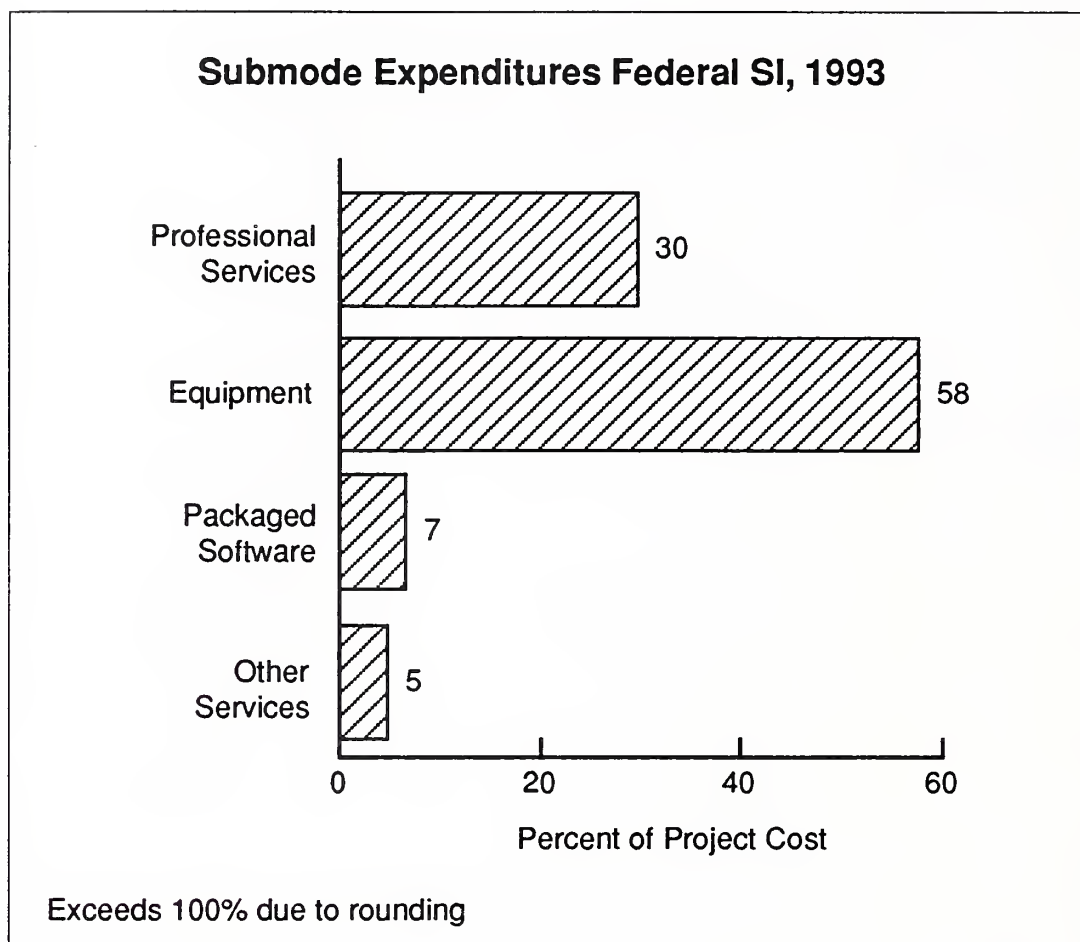


EXHIBIT III-12



4. Additional Marketplace Factors

SI projects provide opportunities for additional revenues for information services because the integrator can obtain a mark-up on the products and services that are integrated. The vendor can also utilize its own services or products and possibly obtain a higher margin when they are included in SI solutions.

SI vendors have the opportunity to sell additional services such as consulting or add-on jobs. These services are often not part of SI projects although they may be counted as part of SI revenues by the vendor. INPUT attempts to separate these revenues where possible.

The tendency for SI firms to sell additional services may indicate a trend taking place for systems integrators to become full-service providers.

5. SI Vendor Trends

As discussed above, many SI vendors are expanding their roles and becoming full-service organizations. CSC, EDS and Andersen Consulting have expanded their ability to offer consulting and professional services, including education and training. Computer hardware vendors who have entered or expanded their SI business such as Unisys, IBM and AT&T also offer a full set of services under their SI umbrellas.

Large SI vendors, including most of the companies noted in the last paragraph, are also offering management consulting services. These vendors are particularly interested in BPR since it can generate SI contracts.

C

Competitive Environment

1. Vendor Strategies

As indicated in Exhibit III-13, vendor strategies include selecting vertical markets or niches in markets where a critical problem is addressed and the vendor can offer a solution.

EXHIBIT III-13

Market Strategies Identified by SI Vendors

Market Strategy	Average Importance
Devote attention to select markets or market niches	4.1
Gain a high level of knowledge of target markets	4.1
Be able to demonstrate or discuss solutions in depth	3.9
Be proactive; bring possible projects to prospects	3.6
Aid with the introduction of new technology	3.5
Leverage consulting skills	3.5

- Vendors also feel that knowledge about an industry or niche in it, as well as the ability to demonstrate solutions to problems in that industry, are important strategies.
- Andersen Consulting demonstrates manufacturing and distribution solutions at multiple centers in the U.S. Big 6 firms such as Deloitte and Touche, and other vendors such as EDS and Unisys, can also demonstrate solutions to prospects.

A small group of vendors feel a key strategy is to use their industry knowledge in a proactive way by approaching companies and suggesting what actions and projects they should carry out to increase revenues.

SI vendors also use their ability to consult on business problems to gain major consulting jobs such as business process re-engineering.

SI vendors consult together with their research on new IT to promote assignments involving the introduction of new technology on client projects or to upgrade client capabilities.

2. Market Shares

Estimates of market shares of the total U.S. SI market for 1992 are indicated in Exhibit III-14 for the leading vendors.

- The most striking change from the 1991 market is that seven of the vendors listed have increased their market share which includes the top six vendors.
- To maintain a leading position among SI vendors, competitors must be constantly striving to gain market share.

Actually, the leading SI vendors would rather maintain a high rate of growth more than gain market share from other competitors. In order to accomplish this, these vendors are moving into new market niches as well as offering new services that will lead to the use of SI, such as consulting in relation to BPR.

EXHIBIT III-14

U.S. Systems Integration Market Share, 1992

Vendor	Share (Percent)
IBM	19
Andersen Consulting	10
EDS/GM	9
Digital	8
Unisys	8
CSC	6
SAIC	5
Martin Marietta	4
TRW	4
PRC	3

In order to maintain a high growth rate, SI vendors will have to devote more attention to the commercial market because the growth rate in the federal market is forecast to fall to 7% for the period from 1993 to 1998. Most vendors serving the federal market have the same shares of the federal market they had in 1991.

- Exhibit III-15 summarizes the shares of the federal market..
- Only SAIC, a specialized vendor, shows an increase in market share.

EXHIBIT III-15

U.S. Federal Systems Integration Market Share, 1992

Vendor	Share (Percent)
IBM	16
SAIC	10
EDS	8
Martin Marietta	8
CSC	7
Unisys	7
Hughes	5
Boeing Computer Services	4
Planning Research Corp.	4
Grumman	3

Exhibit III-16 indicates the market shares of the U.S. commercial SI market in 1992 for leading vendors. The first five vendors in this list had increased their market shares over 1991. The commercial market has been the leading target for the leading SI vendors because it is growing at a faster rate than the federal government market.

EXHIBIT III-16

U.S. Commercial Systems Integrations Market Share, 1992

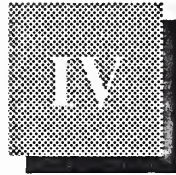
Vendor	Share (Percent)
IBM	21
Andersen Consulting	18
Digital	12
EDS	9
Unisys	8
CSC	5
TRW	4
AGS/NYNEX	3
Price Waterhouse	3
AMS	3

Exhibit III-17 shows vendors with substantial market shares of SI work also have a large amount of professional services. The list of vendors in Exhibit III-17 also includes major vendors that offer systems operations services. Vendors of systems operation services have to call upon SI and professional services capabilities to serve major clients.

EXHIBIT III-17

1992 Revenues of Major Multimedia Vendors

Selected Vendors	Prof. Serv. Revenue	SI Revenue	SO Revenue
IBM	645	1,950	500
CSC	625	595	625
DEC	400	770	150
EDS	560	860	1,600
AndCons	375	785	140
PRC	242	272	65
Unisys	420	700	75
MMDS	120	390	165
Grumman	125	207	25
SAIC	75	545	50
Logicon	273	-	-
AMS	49	212	50
CTG	219	48	9
Nynex	208	153	-



Vertical Markets for Systems Integration

A

Overview

Systems integration vendors orient their services to target vertical markets. They provide solutions to business problems in a particular market by using a combination of industry knowledge and the ability to integrate information services and technology. The service could involve cross industry applications, such as accounting, as well as vertical market application systems, but the service is oriented to the problems in a specific vertical market or niche within the market.

- Systems integration started in the federal market, which is still the largest market for this delivery mode.
- As the federal SI market grew in size and vendors realized the potential for this approach to business problems, they began to offer the service in other vertical markets. Some of these markets, such as discrete manufacturing, have used the service for many years, but in others, the service is not as widespread.

SI vendors are generally identified with the markets where they can provide solutions; as Andersen, CSC and TSC are in manufacturing, EDS and AMS are in banking and Unisys is in airline applications. Most of the vendors just named have SI business in multiple vertical markets, but some, such as SCT, have found solutions focused on only a small section of the overall market.

- Vendors make an effort to maintain solution vitality in their target vertical markets as well as their ability to demonstrate or discuss solutions with prospects. These are both reported as required characteristics of SI vendors required by users.
- Due to the intense effort required to stay at the leading edge of vertical market problems and new ideas on solutions, vendors may not always keep track of the differences in the markets that they are addressing. This can be a disadvantage in competition when changing conditions favor certain types of solutions such as client/server or image-based solutions, more economic approaches or application systems that are faster to implement.

The following analysis of vertical markets will address some of the current differences and opportunities in vertical markets.

B

Discrete Manufacturing

This was one of the first commercial markets to use SI, and continues to be a large market for additional business. Some segments of the market are less attractive than others due to the cutback in defense spending and economic weakness as noted in Exhibit IV-1.

- The aerospace industry and electronic systems for military use are areas of discrete manufacturing hit by cutbacks in defense. These cutbacks caused delays or cancellations of some SI projects.
- Automobile manufacturing was affected by lower consumer purchasing in 1992 and early 1993. This was reported to have an impact on some SI projects as well.
- Apparel manufacturing continued to show weakness throughout 1993 which in one case, was reported to be a deterrent to SI projects.

EXHIBIT IV-1

**Market Factors Reported for Discrete Manufacturing
by SI Vendors****Positive Factors**

- Increase in consumer confidence
- Response to foreign competition
- Desire to use new IT technology
- Need to further integrate "islands"
- Need for re-engineering
- High rate of growth for SI
- Increased use of electronic commerce

Negative Factors

- Slow recovery in selected areas
- Cut in defense spending
- Pressure to control expenditures
- Need for staff with industry and IT knowledge

Exhibit IV-1 points out positive factors in this vertical market including the need to improve productivity in discrete manufacturing as a whole, including the areas noted above, such as electric machinery and miscellaneous production including toys and instruments. This has encouraged the initiation of SI projects. SI has also been used to improve service and marketing systems which are needed to boost sales.

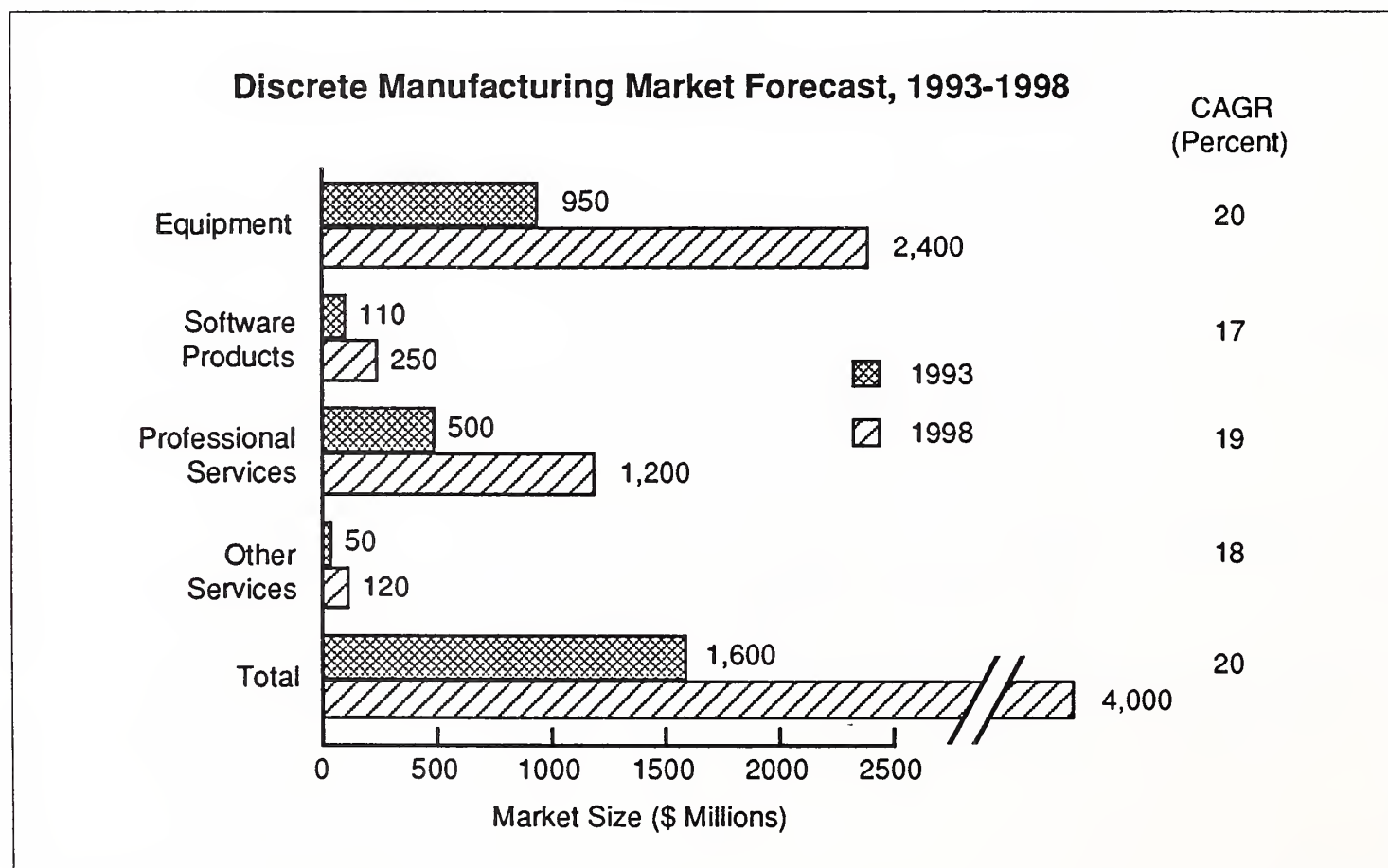
SI is needed to help companies respond to foreign competition by enabling rapid changes to be made in manufacturing. It is also used to further integrate isolated functions (so called islands of information automation) including client/server systems that are making strides in separate activities but are not linked together to provide feedback from customer service to quality control.

Despite the need for SI, its use has been cut back or delayed in some discrete manufacturers because of the need to reduce costs or limit investments, as noted in Exhibit IV-1.

The need for staff with appropriate strength in industry and IT knowledge has made it difficult for some companies to work with SI vendors. Shortages of key skills has also delayed activities of SI vendors in some discrete submarkets.

Despite problems in the economy and cutbacks in defense, the rate of growth of SI use in discrete manufacturing remains high. The present forecast for SI shown in Exhibit IV-2 shows a CAGR of 20% for the period from 1993 through 1998. This is within 1% of the previous five-year forecast that was made. This slight fall-back in growth still leaves discrete manufacturing as one of the fastest growing and most favorable markets for SI work because the volume of SI business in this market is relatively large.

EXHIBIT IV-2



Further information on the type of SI contracts obtained in discrete manufacturing and the vendors who were involved in SI projects is shown in Exhibit IV-3. The number of separate vendors active in discrete manufacturing testifies to the overall attractiveness of this market.

EXHIBIT IV-3

Discrete Manufacturing Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
DEC	Toys R Us	Proprietary
PRC	Black & Decker	20
DEC	Eastman Kodak	50
Andersen Consulting	Timken	125
Unisys	Ford	30
EDS	Cummins Engine	150 (SI and SO)
IBM	McDonnell Douglas	3,000
EDS	Signetics	100
TSC	Whirlpool	Proprietary
TSC	Westinghouse	Proprietary

C

Process Manufacturing

The effect of the slow recovery in a number of submarkets of process manufacturing including steel and other metal production, consumer goods and chemicals in 1992, led to delays in some IT projects as noted in Exhibit IV-4. However, the impact of global competition and the need to meet foreign competition provided a stimulus for systems projects in a number of process manufacturing areas including consumer goods, pharmaceuticals and chemicals.

EXHIBIT IV-4

**Market Factors Reported for Process Manufacturing
by SI Vendors****Positive Factors**

- Increase in consumer confidence
- Pressure to improve productivity and sales support
- Global interest in U.S. consumer goods
- Improved applications solutions
- Increase in growth for SI

Negative Factors

- Slow recovery in a number of areas
- Pressure on some commodity markets
- Mergers and acquisitions
- Pressure against new expenditures
- Need for staff with industry and IT knowledge

The development of software products more suited to process manufacturing, such as the Process 1 product of Andersen Consulting and the PMS product of IBM, also encouraged more use of SI.

A factor that had negative, as well as positive, impact of SI use in this market (consumer goods chiefly), was the continuing influence of mergers and acquisitions.

The overall effect of internal and external factors on process manufacturing led to an increase in CAGR estimated for this market to a level of 15% as indicated in Exhibit IV-5. This market is growing at a rate slightly faster than the overall rate of growth for SI, but it does not have the attractiveness of discrete manufacturing which grew four times greater than process manufacturing in 1993 to five times greater in 1998.

EXHIBIT IV-5

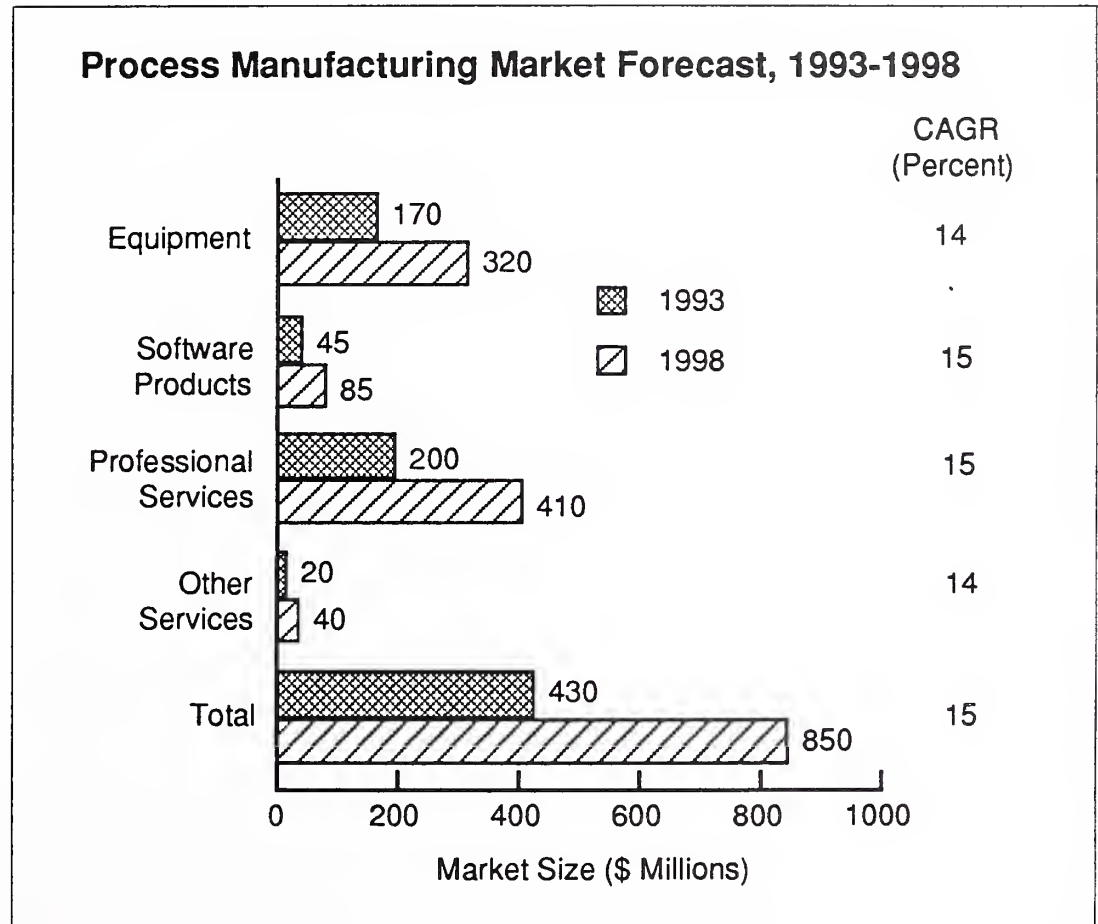


Exhibit IV-6 shows a group of illustrative contracts obtained in process manufacturing together with the vendors who obtained them. It shows a number of the vendors active in discrete manufacturing are also active in process manufacturing.

EXHIBIT IV-6

Process Manufacturing Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
Andersen	ARCO	18
CSC	WCI	64 SI and SO
Ross	Moyer Packing	2
Andersen	Heinz	10
Martin Marietta	Monarch	20
Ross	DuPont	2.5
RMA	Hoechst	Proprietary
CSC	Boise Cascade	17
Andersen	Sun Oil	175
Perot	Springs Industry	26
EDS	National Steel	2.5
EDS	Anchor Glass	30 SI and SO
EDS	Cyprus Minerals	16 SI and SO

D**Transportation**

As illustrated in Exhibit IV-7, there was an increase in travel and trade in 1993 which has been helpful to the transportation market. Volume has been increasing in airline sales as well as in trucking, water transport and intermodal shipping. However, the airline business and shipping was noticeably affected by the recession in 1992, and recovery has been slow. Also, there has been price competition in the market which has endangered margins and contributed to business failure.

EXHIBIT IV-7

**Market Factors Reported in Transportation Sector
by SI Vendors****Positive Factors**

- Pickup in trade in 1993
- Increase in travel in 1993
- Need for new and upgraded, large application systems for airlines
- Pressure to improve productivity
- Improving bottom line at some companies
- High rate of growth for use of SI

Negative Factors

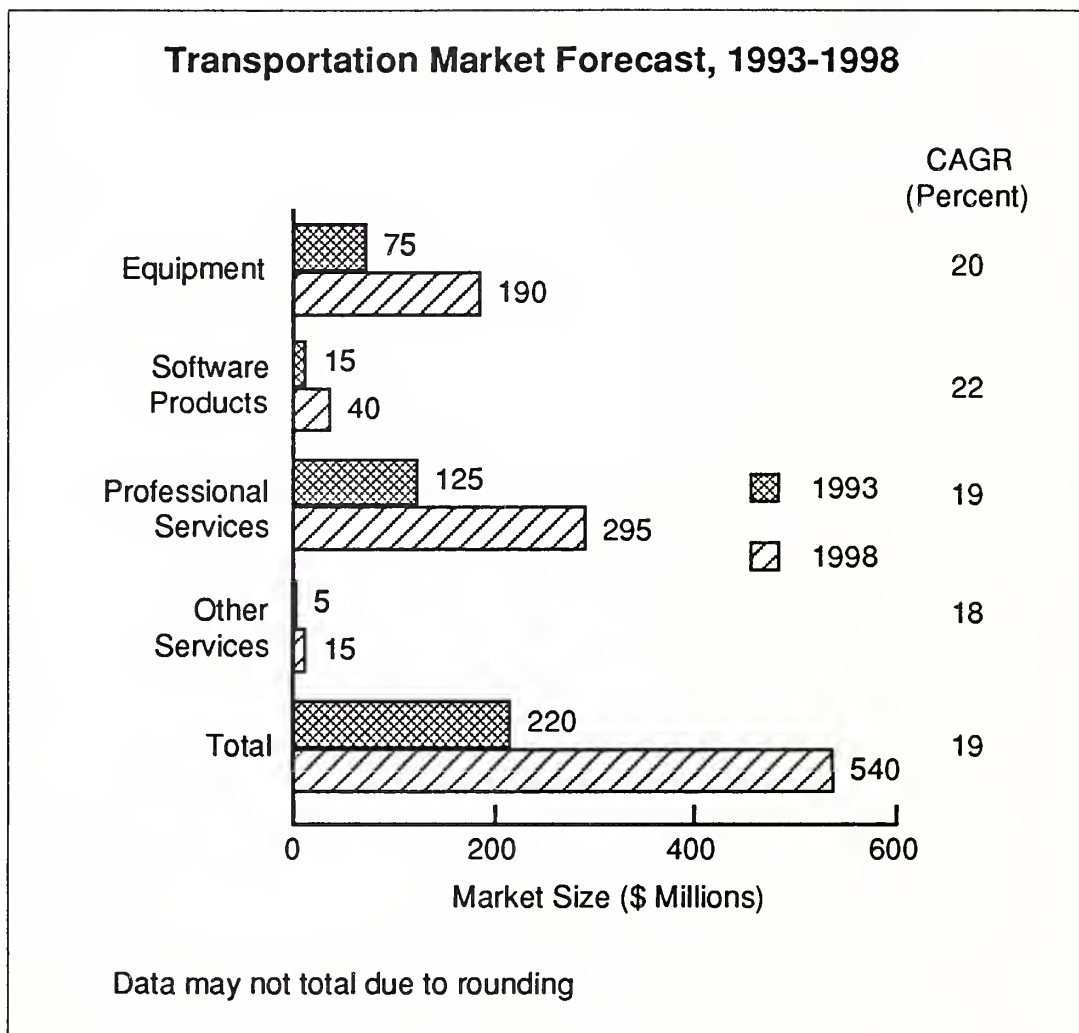
- Recession and fall in transportation volumes in 1992
- Fare competition in airlines
- Competition in trucking and water transport
- Mergers and acquisitions
- Pressure against new expenditures

There are needs in the marketplace which are stimulating the use of information services and SI in particular. There is pressure to increase productivity as well as a need in airlines to upgrade reservation, maintenance and administrative systems. One illustration of the contribution being made by SI is the introduction of imaging systems in five airlines to help match sales and the use of airline tickets copies by Andersen Consulting which has resulted in meaningful savings as well as improved administration.

The growth forecast for SI business for the vertical market shown in Exhibit IV-8 is noticeably above the average CAGR for SI. Software products is growing most rapidly, but the submode

of service that remains largest is professional services driven, in part, by the specialized programming requirements for airline reservation systems (CRS).

EXHIBIT IV-8



Airlines have provided most of the opportunities for SI and other IT business. Reservations, maintenance, cargo, agent services and other systems need regular upgrading. Examples of the SI vendors active in transportation are shown in Exhibit IV-9.

EXHIBIT IV-9

Transportation Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
AMRIS	Alaska Airlines	Proprietary
Andersen Consulting	Northwest Airlines	Proprietary
Andersen Consulting	Delta	Proprietary
Unisys	United	Proprietary
DEC	Delta	4.6
Unisys	Japan Airlines	70
SAIC/DEC	Baltic & International	100
Litton	American Airlines	17

E**Utilities**

Recent surveys of the utilities market, as well as the opinion of some SI vendors, is that this market is showing a growing need for improved systems for sales and service support as illustrated in Exhibit IV-10. The pick up in the economy in 1993 and inroads that client/server use has made in utility companies have stimulated the utilities market as well.

The need to upgrade older mainframe systems is also noted, particularly the systems that handle purchasing, inventory and materials management. However, the tendency of many utilities is to seek the products and assistance of software product vendors to meet many of their needs rather than to turn to SI firms.

EXHIBIT IV-10

Market Factors Reported for Utilities by SI Vendors**Positive Factors**

- Growing need for improved sales and customer service support
- Pick up in economy in 1993
- Inroads made by client/server technology
- Need for restructuring/re-engineering
- Need for upgrading and integrating purchasing inventory, and material management systems

Negative Factors

- Regulatory and environmental constraints
- Small number of large utility companies
- Pressure to limit new investments
- Interest in other delivery modes versus use of SI

The utilities market has a number of factors that limit growth of SI including pressure to limit investments, the small number of large companies, and regulatory and environmental constraints which complicate projects. The overall growth of SI will fall well below the average for vertical markets as shown in Exhibit IV-11.

A list of vendors who have recently obtained contracts in this market and their clients is shown in Exhibit IV-12. The list includes leading SI vendors such as CSC, Andersen Consulting and DEC.

EXHIBIT IV-11

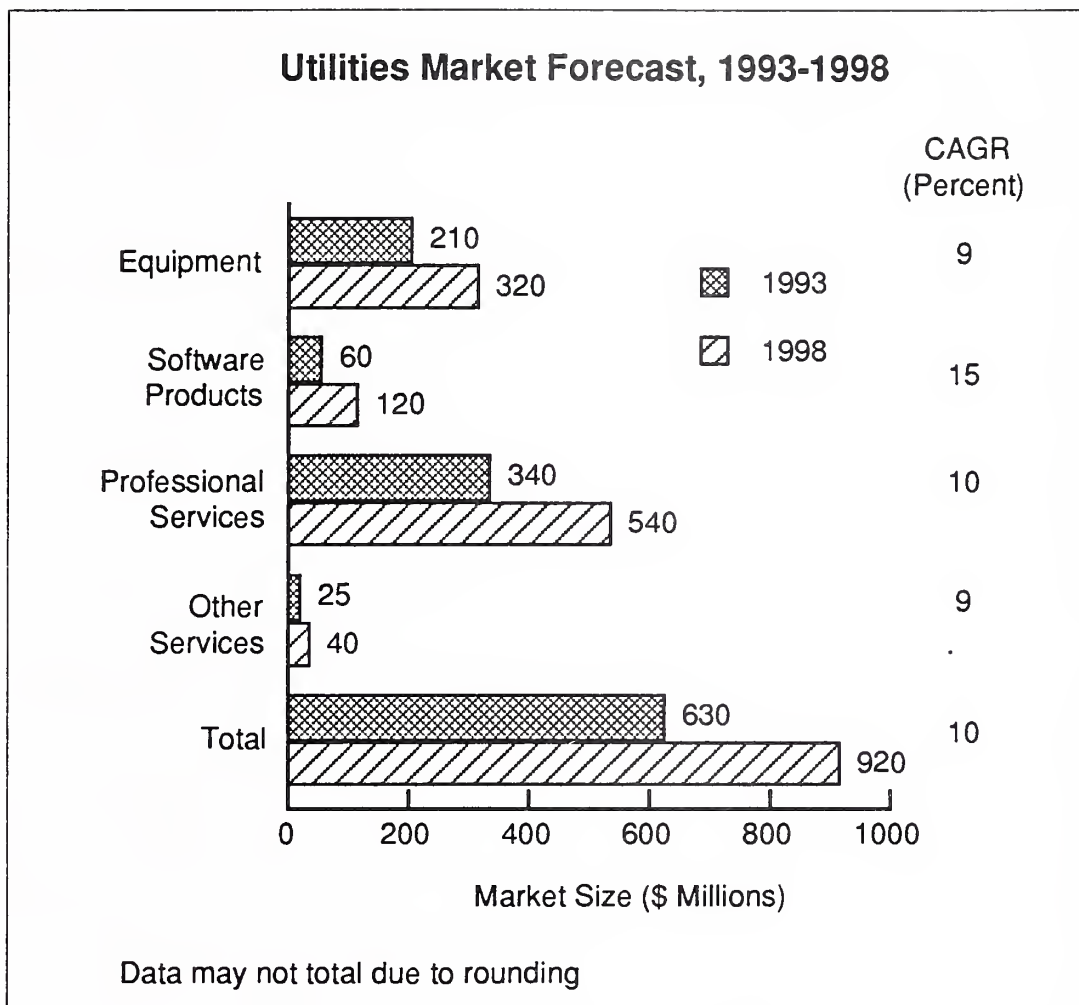


EXHIBIT IV-12

**Utilities Market
Examples of Recent SI Vendors and Client Contacts**

Vendor	Client	Size (\$ Million)
Andersen	Texas Util.	1.5
CDC	TVA	Proprietary
DEC	Trans Alta	150
Ebasco	Watts Bar	Proprietary
SAP America	Cincinnati Gas & Electric	16
CSC	Mass. Dept. of Water Resources	Proprietary

F**Telecommunications**

Telecommunications showed little effect from the recession, and there are a number of factors that vendors feel will have a positive impact on the use of SI as shown in Exhibit IV-13.

EXHIBIT IV-13**Market Factors Reported for Telecommunications
by SI Vendors****Positive Factors**

- Expanding network usage by business
- Growth of new products/services such as cellular and radio-based communication
- Anticipated use of multimedia
- Increasing use of business services dependent on networks such as EDI
- Need for restructuring or re-engineering
- High rate of growth for use of SI

Negative Factors

- Possible regulatory impacts
- Historical resistance to changes in business organization
- Unionized employees
- Internal technical directions

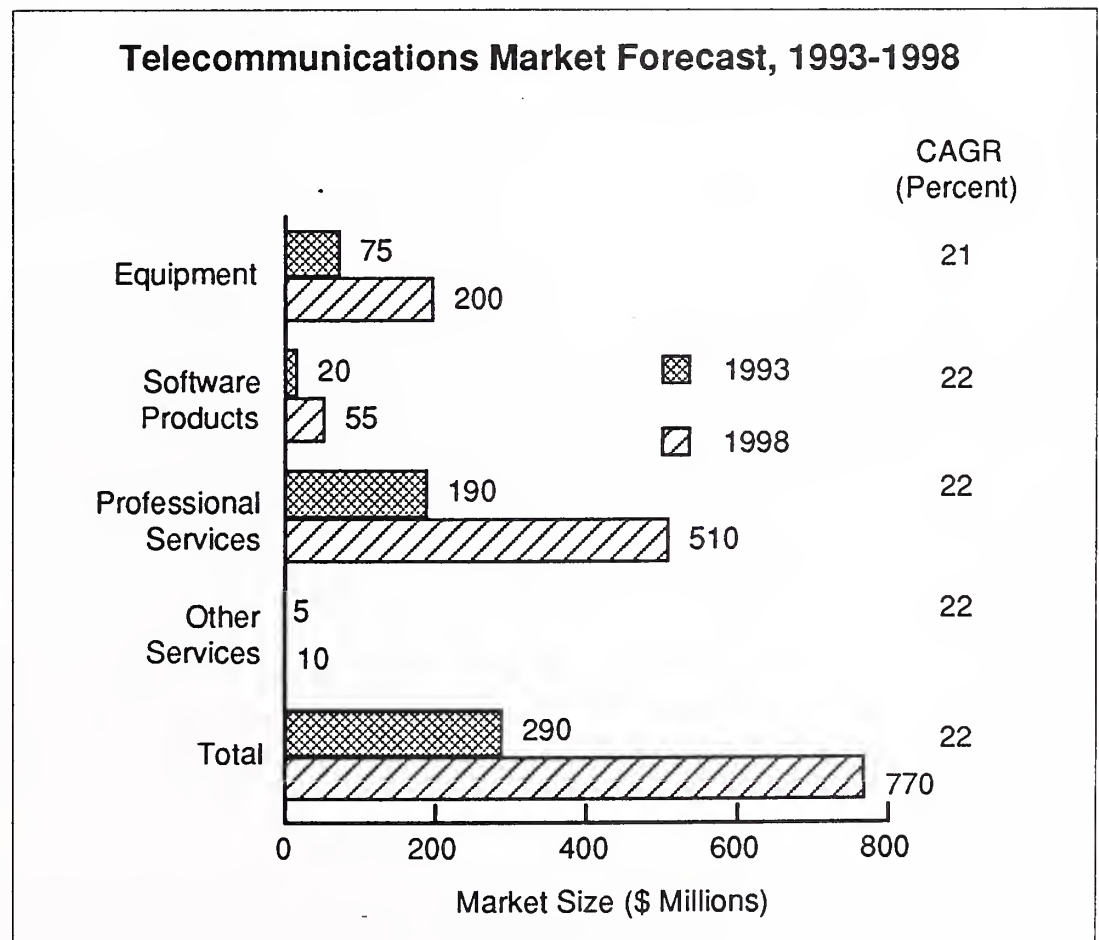
- There is increasing interest throughout business in application systems to expand network usage, including use of EDI and electronic commerce.
- New services are being introduced from cellular to other wireless services as well as multimedia. These new services will increase telecommunication business and promote the use of information services, including SI.

There is also a high level of interest in some telecommunication firms to improve their level of service and restructuring or re-engineering business processes. Several SI vendors have been active in these activities.

The telecommunications market suffers from possible resistance to change, in some companies, as well as a tendency to select its own technical direction, which can make it difficult for SI vendors to recommend change. Possible regulatory impacts and the role of unionized employees are other negative factors to consider.

Despite these factors, the market is very favorable for the use of SI as shown in Exhibit IV-14. Use is forecast to increase over the next five years at a CAGR substantially above the average for all vertical markets.

EXHIBIT IV-14



A list of SI vendors and their clients is shown in Exhibit IV-15. The list includes a group of the largest SI vendors as well as several smaller vendors of SI services. CGA and CSC both made use of consulting capabilities to develop SI business.

EXHIBIT IV-15

Telecommunications Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
CGA	Bell Atlantic	4
CGA	SNET	Proprietary
RCG	AT&T	Proprietary
EDS	Western Union	250
CSC	AT&T	Proprietary
CSC	U.S. Sprint	Proprietary
AMS	Alltel	Proprietary
IBM	GE/NBC	Proprietary

G

Retail Distribution

SI vendors report a number of factors are improving the opportunities for SI business in retail distribution as shown in Exhibit IV-16.

- Consumer confidence began to recover in 1993 and purchases of a number of retail items began to increase by year end. However, weakness still could be felt in clothing and some other goods.
- Interest in faster and improved service from suppliers and use of POS, card technology and communications, continue to increase.
- SI vendors are sought to aid with the expanding use of technology.

EXHIBIT IV-16

**Market Factors Reported for Retail Distribution
by SI Vendors****Positive Factors**

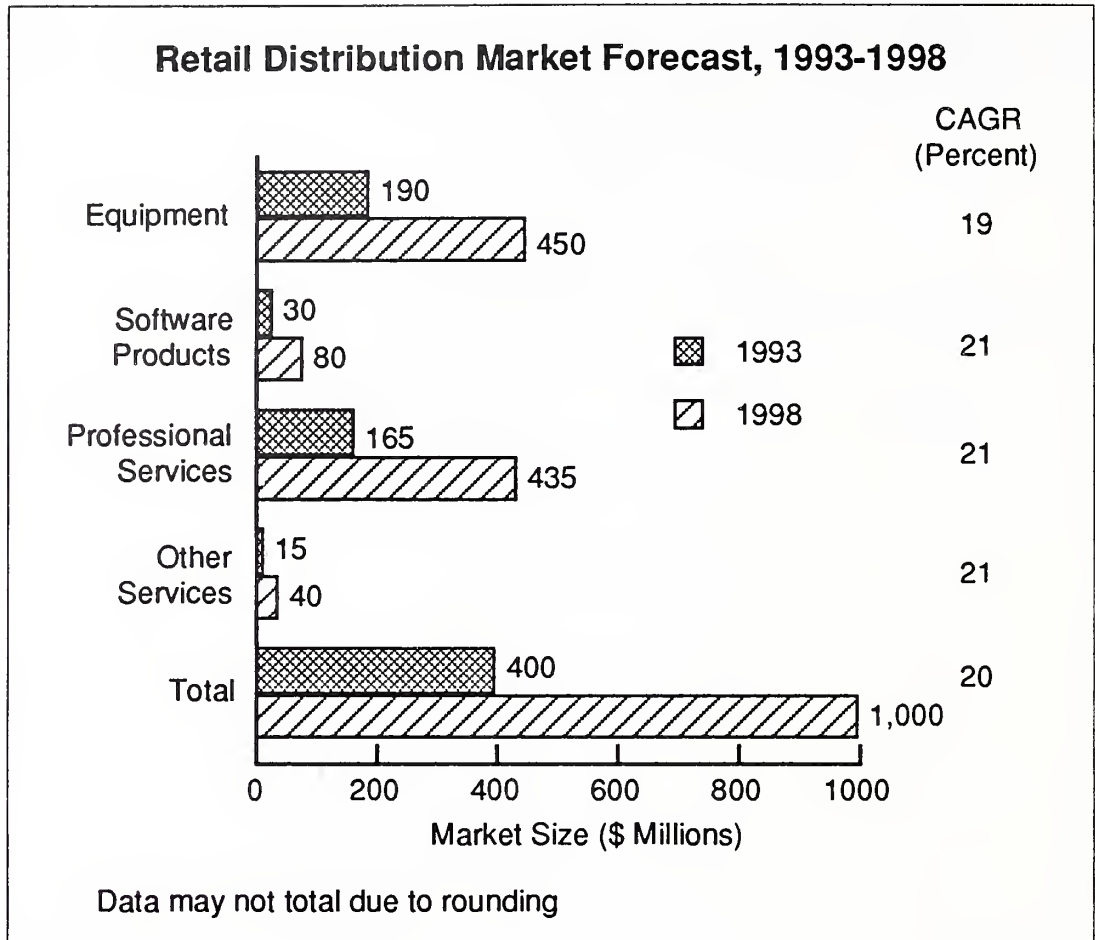
- Improving consumer confidence
- Expanding use of POS and card technology
- Interest in faster supply and improved service is increasing
- Expanding use of communications and network services such as EDI
- High rate of growth for use of SI

Negative Factors

- Low profit margins
- Precarious condition of some large companies
- Desire to economize on IT expenditures
- Limited number of large companies

Despite falling margins and failure in other vertical markets, the use of SI in retail distribution is increasing at a much faster rate than the average use of SI in other markets. In the next five years, the total use of SI will increase by 250% in this market according to the estimate shown in Exhibit IV-17.

EXHIBIT IV-17



The range of SI vendors active in the retail distribution market is illustrated by a selection of recent contracts shown in Exhibit IV-18. There is a broad range of clients using SI. They include mail order as well as retail stores together with pharmacies, car rental companies and hotels.

EXHIBIT IV-18

Retail Distribution Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
CSC	Pearle Vision	20
IBM	Marriott	Proprietary
Sun	Avis	5
EDS	Montgomery Ward	100 SI and SO
ISSC	Hertz	Proprietary SI and SO
DEC	CVS Pharmacies	16.5
Litton	Sears	6
TSC	Bear Creek	20
TSC	Michigan Bulb	Proprietary
DEC	Victoria's Secret	16.5

H

Wholesale Distribution

Wholesale distributors are not doing as well as retailers, partially because many retailers are bypassing the distributors and going directly to manufacturers as indicated in Exhibit IV-19.

Wholesaler's need to make their businesses respond more rapidly and with more service to retailers, can be a stimulus to SI work. The possibility of using SI to improve communication, aid with electronic commerce or reduce costs is also a stimulant. The pick up in the economy, as a whole, and the quantity of new orders have also expanded interest in SI services.

EXHIBIT IV-19

**Market Factors Reported for Wholesale Distribution
by SI Vendors****Positive Factors**

- Pick up in the economy and orders
- Need for faster and more responsive service
- Need of improved communication
- Expanding use of electronic commerce
- Possibility of cost savings through downsized systems

Negative Factors

- Narrow margins
- Large retailers are bypassing wholesalers
- Limited funds for investment
- Small size of many establishments

The narrow margin of wholesalers and limited, available funds for investment in information services, has restricted the growth of SI to a rate well below that of retail distribution. However, the CAGR for the 1993 to 1998 period will be about 16% as indicated by Exhibit IV-20, which is above the average increase for the use of SI in other markets.

The list of SI vendors shown in Exhibit IV-21 contains some vendors that also serve retail distribution. Experience in one of these markets can aid in the analysis of problems in the other market in many situations.

EXHIBIT IV-20

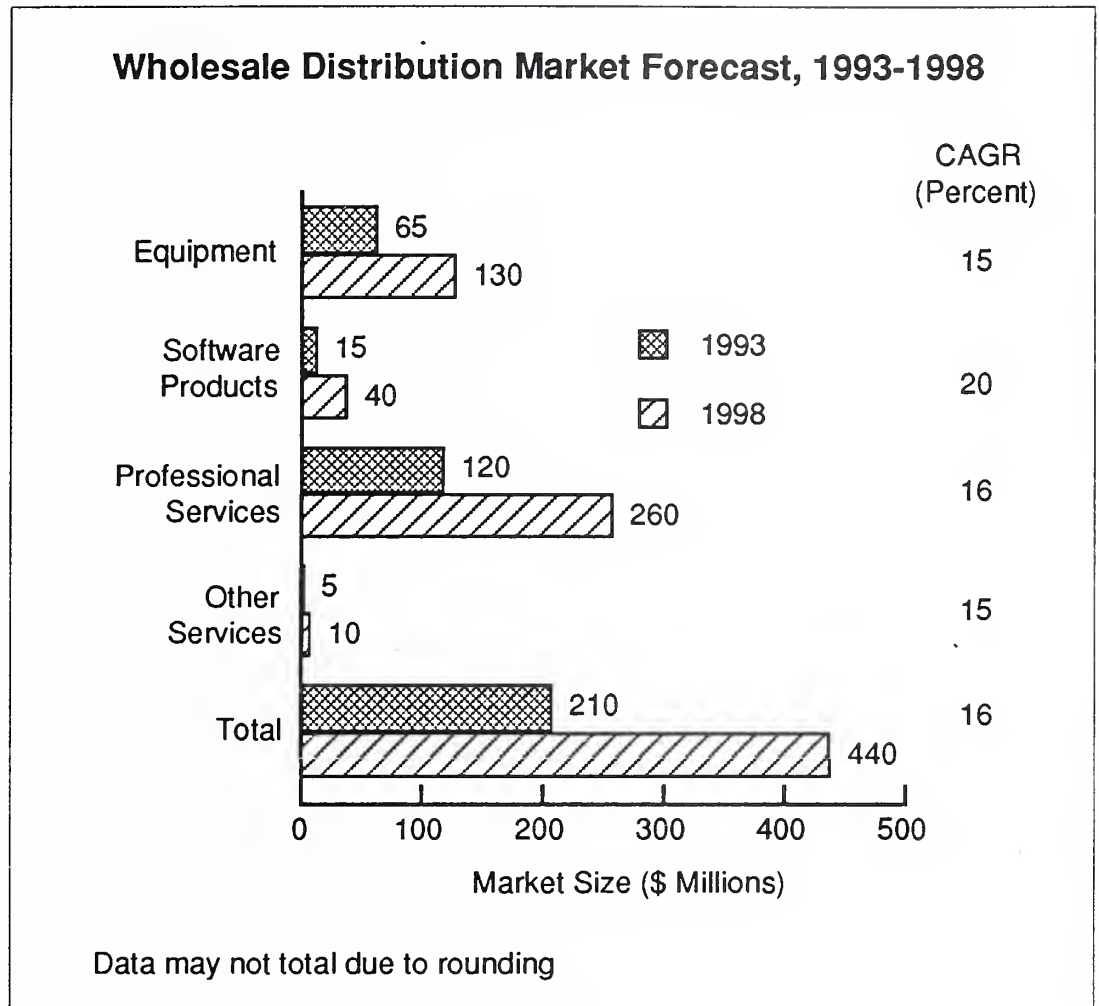


EXHIBIT IV-21

**Wholesale Distribution Market
Examples of SI Vendors and Clients During the Recent Past**

Vendor	Client	Size (\$ Million)
Andersen Consulting	Revlon Distribution	9
CSC	British Home Stores	150 - 200
DEC	Kaman	Proprietary
AT&T/IBM	Crucible Service Centers	Proprietary
UIS	Ace Distributors	2
EDS	Smith Food & Drug Centers (Distrib)	160

I

Banking and Finance

The favorable spread between the cost of funds and interest charged, the increase in stock market trading and the pick up of the economy in 1994, have been profitable for this vertical market and for SI vendors as indicated in Exhibit IV-22. Application directions, including the use of expanded networks and client/server technology, along with the need for more integration and improvement of major systems offer opportunities for SI, according to vendors.

According to several vendors, SI business had been obtained based on the business interests and capabilities in international lending/funding, trading projects in banking and an extension of electronic services and trading support in brokerage businesses.

EXHIBIT IV-22**Market Factors Reported for Banking/Finance
by SI Vendors****Positive Factors**

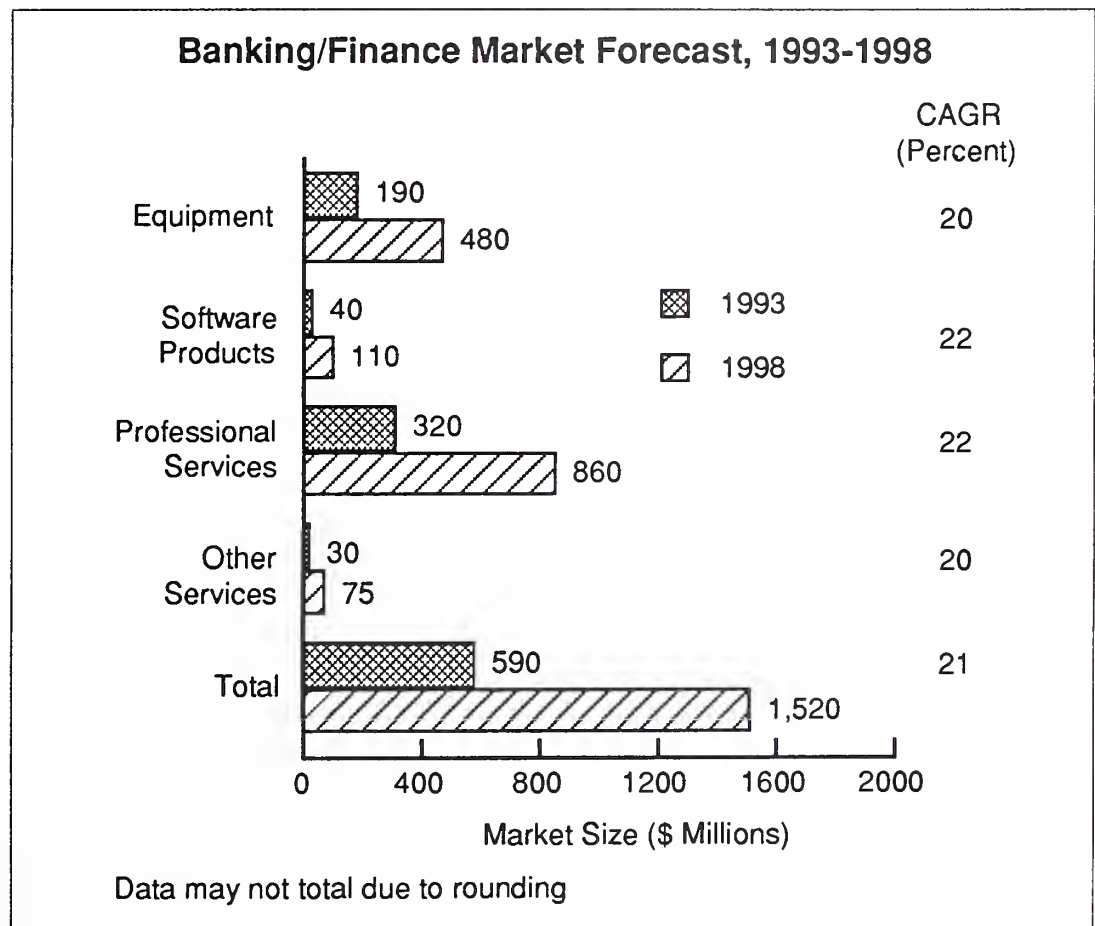
- Favorable spread on interest rates
- Increase in stock trading volume
- Pickup in the economy in 1993
- Need for expanded networks
- Need for more integration and improvements in major systems
- Growth of electronic banking
- Interest in client/server technology
- Growth rate for use of SI

Negative Factors

- Competition from foreign and nonbank institutions
- Continuing impact of saving and loan problems
- Mergers and acquisitions
- Possible outsourcing

Negative factors such as competition from foreign organizations and other types of financial institutions, mergers and acquisitions (that could potentially reduce jobs), and the continuing worry about the health of financial institutions, are driving banks and brokerages to support a healthy growth rate for the use of SI as shown in Exhibit IV-23. The professional services component of SI and particularly consulting, will benefit most in terms of CAGR. Consulting is needed to deal with the change in use of IT that has occurred by expanding use of networks and client/server technology in this vertical market.

EXHIBIT IV-23



Some of the vendors active in the sale of SI are listed in Exhibit IV-24. A wide range of vendors is listed from large computer manufacturers to firms generally known as consultants such as McKinsey and Booz Allen.

EXHIBIT IV-24

Banking and Finance Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
Unisys	Republic Bank of Bakersfield, CA	56 SI and SO
IBM	Barnett Bank	Proprietary
IBM	First American	25
Booz Allen	Chase Manhattan (International Dept.)	2
Network Equipment Tech.	Paine Webber	2.3
Comtex	Paine Webber	Proprietary
Andersen Consulting	BancOne Corp.	45
McKinsey	Chemical	3.0
GTE	Barnett Banks	Proprietary
IBM	Merrill Lynch	Proprietary

J**Insurance**

SI vendors report the combination of the partial recovery of the insurance business in 1993 and opportunities resulting from new products and market expansion, should stimulate growth of SI in this vertical market as indicated in Exhibit IV-25. There are negative factors, however, including problems in investments and difficulties in the property and casualty business in 1992 that have created pressures to limit investments.

EXHIBIT IV-25

**Market Factors Reported for Insurance
by SI Vendors****Positive Factors**

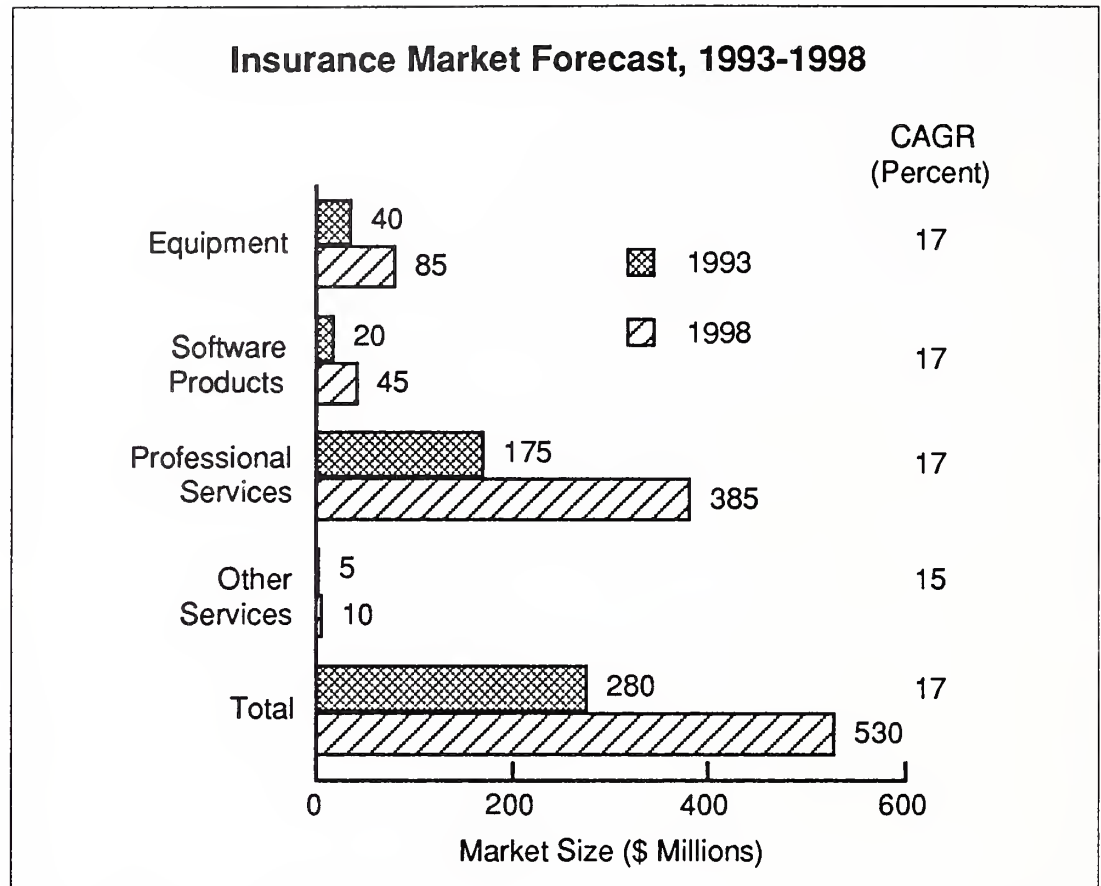
- New health legislation
- Growth of on-line systems
- Global opportunities
- New insurance products
- Improvements of business in 1993
- Above average growth in use of SI

Negative Factors

- Mergers and acquisitions
- Problems with investments
- Lingering concerns in property/casualty business
- Pressure to limit expenditures

Growth of SI in the insurance business is forecast to exceed the average for vertical markets as illustrated in Exhibit IV-26, but will not be as healthy as the manufacturing, banking/finance or telecommunications markets.

EXHIBIT IV-26



A list of some SI vendors who have recently obtained contracts in this market and their clients is shown in Exhibit IV-27. It primarily includes major SI vendors.

EXHIBIT IV-27

**Insurance Market
Examples of SI Vendors and Clients During the Recent Past**

Vendor	Client	Size (\$ Million)
Andersen Consulting	Aetna	Proprietary
CSC	AMP Society	300 SI and SO
Unisys	Blue Cross/ Blue Shield	Proprietary
ISI	Worldwide Insurance	Proprietary
CSC	North American Life	Proprietary SI and SO
DEC	Prudential	Proprietary

K**Health Services**

SI vendors report government interest in health services, together with the pressures in most hospitals and other health organizations to improve cost management, are encouraging further use of SI as noted in Exhibit IV-28.

- Some hospitals have taken steps to improve outpatient and other services but need further automation to aid with these services.
- Health organizations feel the need to collect better data from their operations and services and improve the networks and applications that link services to their administrative and management operations.

EXHIBIT IV-28**Market Factors Reported for Health Services
by SI Vendors****Positive Factors**

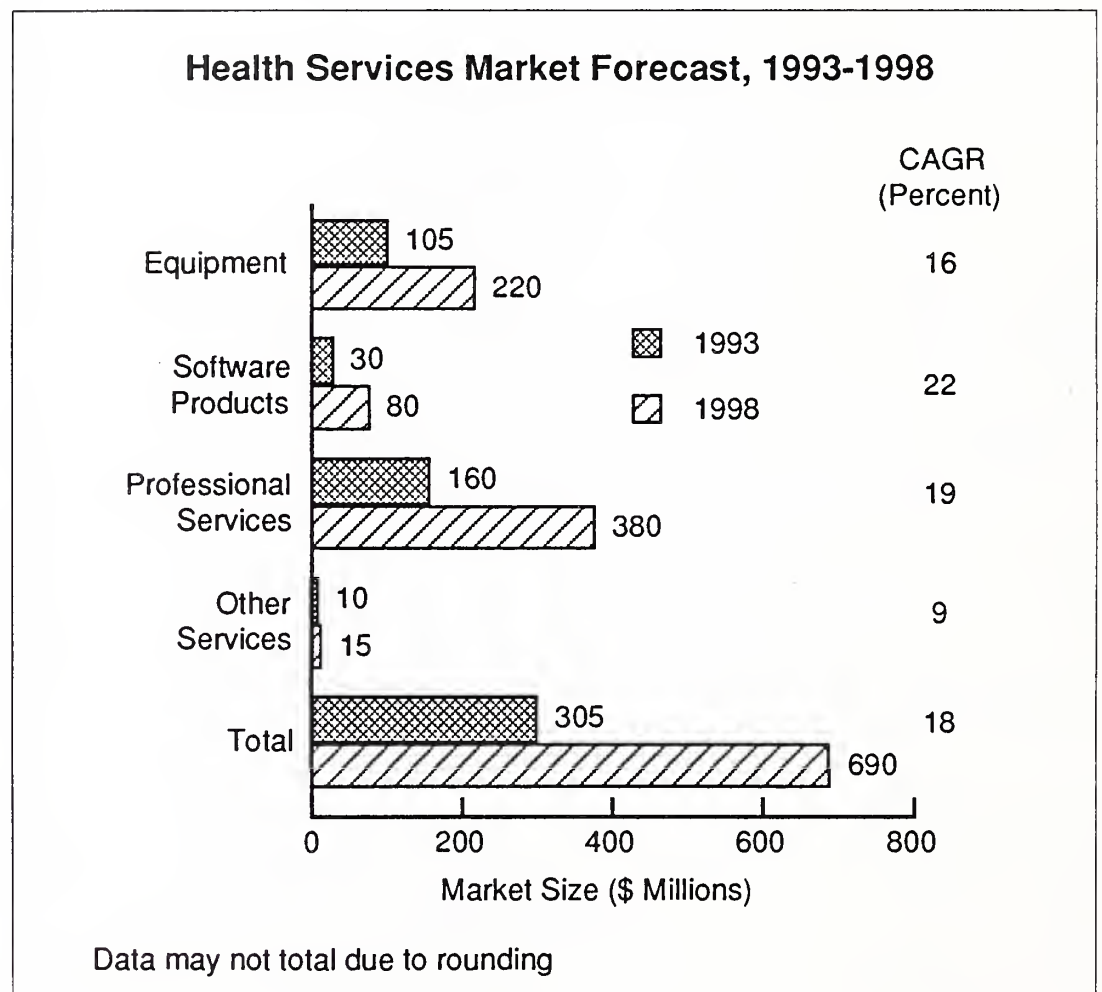
- Government interest in expanding services
- Increasing outpatient business
- Need for improved cost management
- Need for more care data
- Need for improved network applications
- Above average growth in use of SI

Negative Factors

- Small number of large organizations
- Government and insurance industry pressures
- Difficulty in isolating funds for IT projects or service
- Problems in gaining recognition as an IT provider

Despite the small number of large organizations and the difficulty of devoting funds to IT projects and services, the use of SI in hospitals will increase at a CAGR of 18% between 1993 and 1998, which exceeds the average growth in other vertical markets. Due to the unique situations in health organizations, the emphasis in SI has been on the use of computing, communication equipment and professional services, as shown in Exhibit IV-29. However, the software product submode is increasing at the fastest rate among submodes indicating applications may become more standardized in the future.

EXHIBIT IV-29



The list of SI vendors with recent projects in the health services market shown in Exhibit IV-30 contains both specialists in the health market and vendors known for SI work in a number of industries.

EXHIBIT IV-30

Health Services Market Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
SMS	Sloan Kettering	Proprietary
Perot	Texas Children's Hospital	Proprietary SI and SO
PRC	Brooklyn VA Medical Center	33
Andersen Consulting	Voluntary Hospitals of America	50
Comtex	Sloan Kettering	Proprietary

L

Education

Together with a need for more distributed services, the education market also needs to upgrade and integrate older systems as indicated in Exhibit IV-31.

EXHIBIT IV-31

Market Factors Reported for Education by SI Vendors

Positive Factors

- Need for distributed services
- Need to integrate and/or replace older systems
- Research funding by industry that can be spent on IT
- Government interest in improvements
- Interest in using new IT

Negative Factors

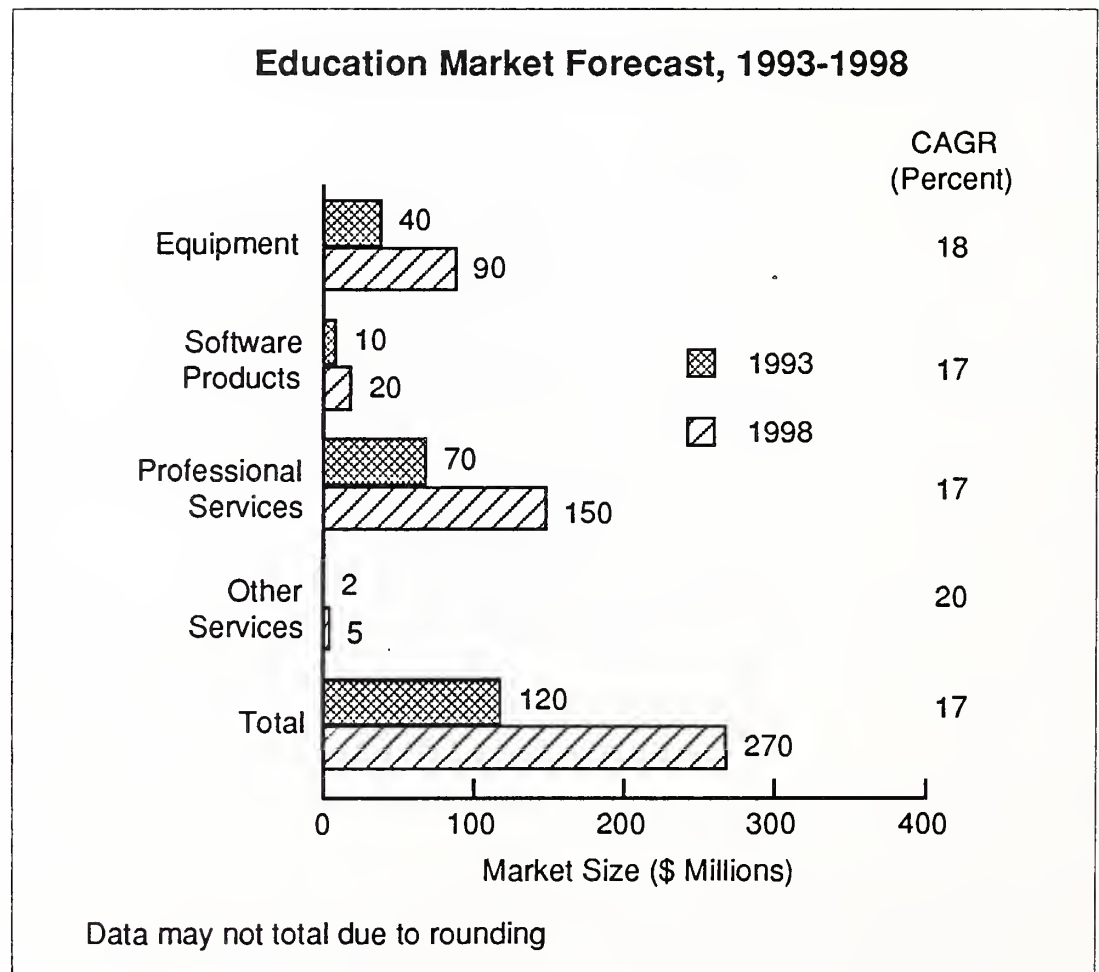
- Limited funding
- Competing needs
- Federal cuts in programs
- State programs may override plans

Vendors report that these needs, together with increased federal and local government interest in education and the availability of private industry funding, provide stimulants for the use of SI.

Education is also beset with a number of negative factors today, including limited funding, federal cuts in programs and competing needs for available funds.

- These factors have kept the use of SI in education at a minimum.
- Nevertheless, the needs of education are strong enough to encourage a CAGR of 17% in the education market as shown in Exhibit IV-32.

EXHIBIT IV-32



The professional services submode is used more on a relative basis compared to other vertical markets reflecting the unique nature of needs in each institution.

Examples of SI vendors and clients in relation to recent contracts are shown in Exhibit IV-33. Vendors specializing in the education market are represented as well as SI vendors who serve a number of markets.

EXHIBIT IV-33

Education Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
HP	Univ. California Berkeley	Proprietary
SCT	G. Washington University	42
U.S. Air Force	Rome School District	Proprietary
IBM/DEC	M.I.T	100
SCT	Florida Institute of Technology	17
Wicat	Utah	1.1
Wicat	Pulaski County, VA	0.9

M

Business Services

Some positive factors in regard to potential SI business in this vertical market were improvement in the economy, the need to address more complex products and services and changes in laws and regulations as indicated in Exhibit IV-34.

- Expanded complex products and services, including support services to business process engineering or new types of auditing services that are being introduced by Big 6 vendors, can require assistance or alliances with SI firms in some cases.
- The growing need for networks and use of proprietary databases by engineering consultants, provide opportunities for SI Big 6 firms and other business services.

EXHIBIT IV-34

**Market Factors Reported for Business Services
by SI Vendors****Positive Factors**

- Improvement in economy
- More complex products and services
- Changes in laws and business regulations
- Expanding need for networks and database use
- High rate of growth for use of SI

Negative Factors

- Strong in-house control of IS by many companies in this vertical market
- Many small enterprises
- Many business mergers and acquisitions

The strong in-house control of IS in some areas of business services and the number of small enterprises in this market can be SI deterrents in some cases. Nevertheless, the CAGR for SI in the business services market will be approximately 23% between 1993 and 1998 as shown in Exhibit IV-35.

- This growth rate is significantly higher than the average growth rate for SI in other markets.
- Although the use of the software products submode is increasing rapidly, the use of the professional services submode is much larger than all others testifying to the need for consulting and software modification in this market.

Exhibit IV-36 indicates some vendors who have recently obtained SI contracts in business services and the clients involved.

EXHIBIT IV-35

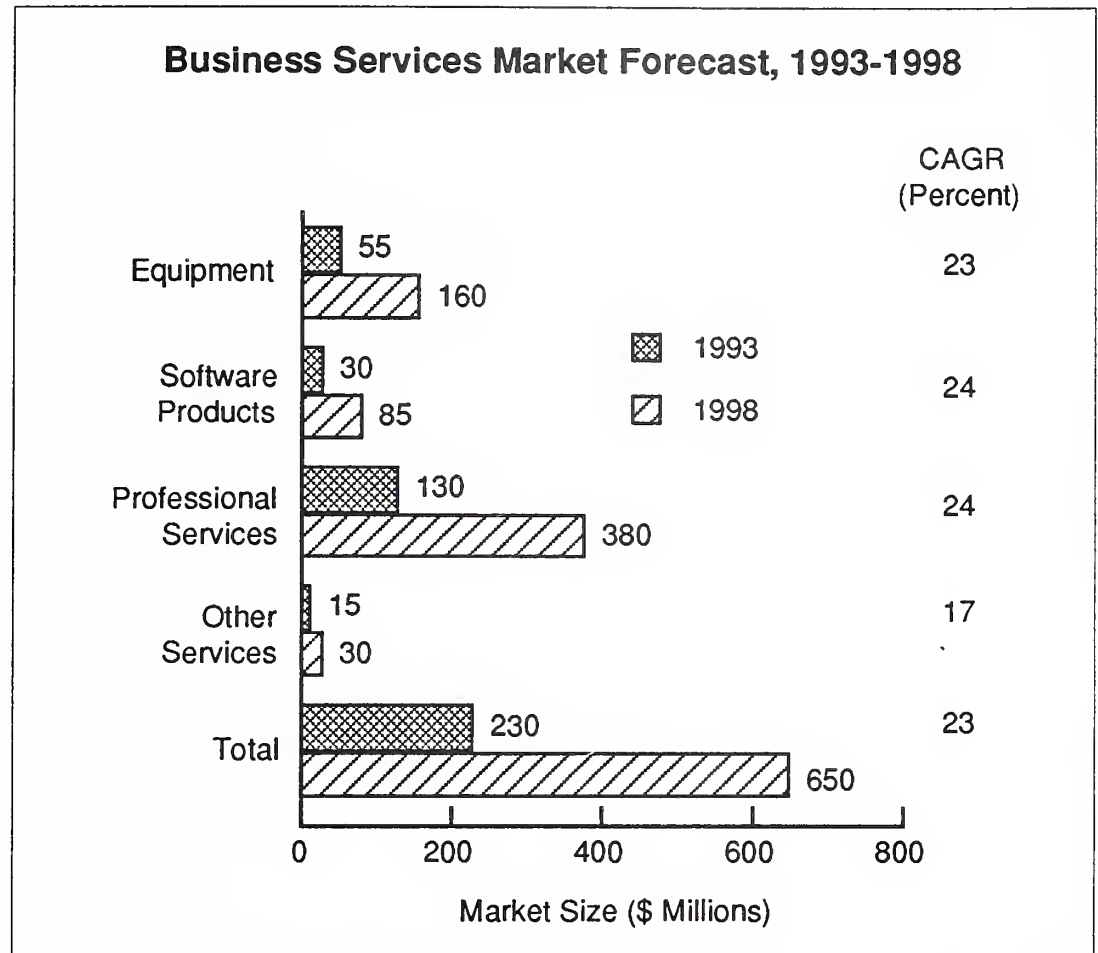


EXHIBIT IV-36

Business Services Market
Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
Novell/Palindrome	Johnson & Gibbs	Proprietary
Micrognosis	Quatron	Proprietary
Cobre Group	Computer Assoc.	Proprietary
Data General	Epic Systems	Proprietary
Comtex	ADP	Proprietary
PRC	Ebasco Services	30

N

Federal Government

Plans of the new administration, as well as the need to upgrade existing systems, can encourage the use of SI as indicated in Exhibit IV-37. The size of the federal SI business is also considered a positive factor because the systems involved will require ongoing additions, new subsystems and replacements.

EXHIBIT IV-37**Market Factors Reported for the Federal Government
by SI Vendors****Positive Factors**

- New administration plans
- Need to upgrade systems
- Size of federal SI business

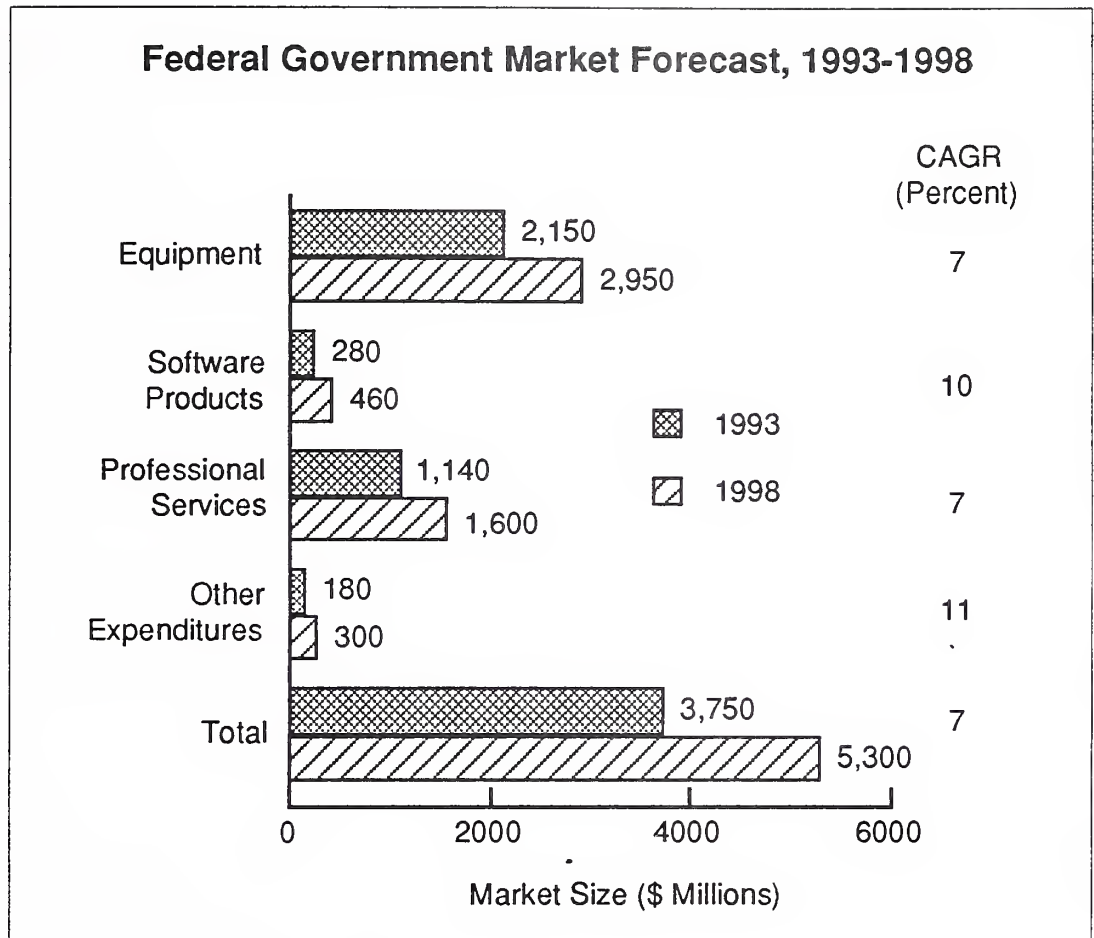
Negative Factors

- Cutbacks in defense spending
- Pressure for economy and reduced spending in government
- Fall-in rate of growth for SI use
- Number of competitors

There are significant negative factors present in this vertical market, however, led by the cutbacks in defense spending. The pressure for reduced spending in government and the number of competitors are also deterrents to SI business.

The CAGR for SI business has fallen to 7% for the period from 1993 to 1998, as shown in Exhibit IV-38. This is about half the growth rate for the SI market as a whole.

EXHIBIT IV-38



The equipment submode is the largest of the government market. This is partially caused by a reluctance to use one component of the professional services submode—consulting services. Another factor is the greater use of mainframe computers for government contracts, compared to the relative use of mainframes in commercial markets.

A number of major SI vendors have concluded recent SI contracts with government agencies as shown in Exhibit IV-39.

- Some of these vendors such, as Boeing and Grumman, are devoted chiefly to the federal SI market.
- Others such as IBM, Unisys and CSC have a large volume of federal, as well as commercial, SI business.

EXHIBIT IV-39

Federal Government Market Examples of SI Vendors and Clients During the Recent Past

Vendor	Client	Size (\$ Million)
CSC	Bureau of Land Mgmt.	400
PRC	President's Office	21
Unisys	Dept. of Energy	Proprietary SI and SO
IBM	FAA	Proprietary
PRC	U.S. Patent Office	166
Grumman	Naval Oceanographic	204
IBM	IRS	340
Boeing	U.S. Army	1,600
TRW	IRS	300
SHL	U.S. Postal Service	270

Vendors can change their level of interest in a major market such as the federal market. CSC and PRC have made efforts to reduce the percentage of their SI business devoted to the federal market, and IBM sold its federal SI business to Loral during 1993.

O

State and Local Government

SI vendors report the continuing demand for improved state and local governmental services, the need for expanded network capabilities and upgraded systems for tax collection, urban development, criminal justice, environmental services and other undertakings, offer opportunities for SI as noted in Exhibit IV-40.

EXHIBIT IV-40

**Market Factors Reported for the
State and Local Government Market
by SI Vendors****Positive Factors**

- Continuing demands for improved services
- Need for improved or new network capabilities
- Need to upgrade or replace older application systems
- Shortage of qualified IS staff
- Size of state government IT expenditures

Negative Factors

- Limited funds available
- Competition for funding
- Below average growth in use of SI

Limitations in state and local funding, competition for available funds, as well as competition from other delivery modes, are holding the growth CAGR for SI to 12% between 1993 and 1998 as indicated in Exhibit IV-41. This is a few percent below the average growth of SI in other vertical markets.

Professional services is the largest submode of SI in this market and is growing more rapidly than other submodes. This indicates a need for customization of SI solutions among state and local government entities.

There are a number of leading SI vendors active in the state and local government market as shown in the list of selected recent contracts in Exhibit IV-42. The list also includes a number of different types of vendors including computer manufacturers, communication vendors, Big 6 companies and firms devoted solely to information services.

EXHIBIT IV-41

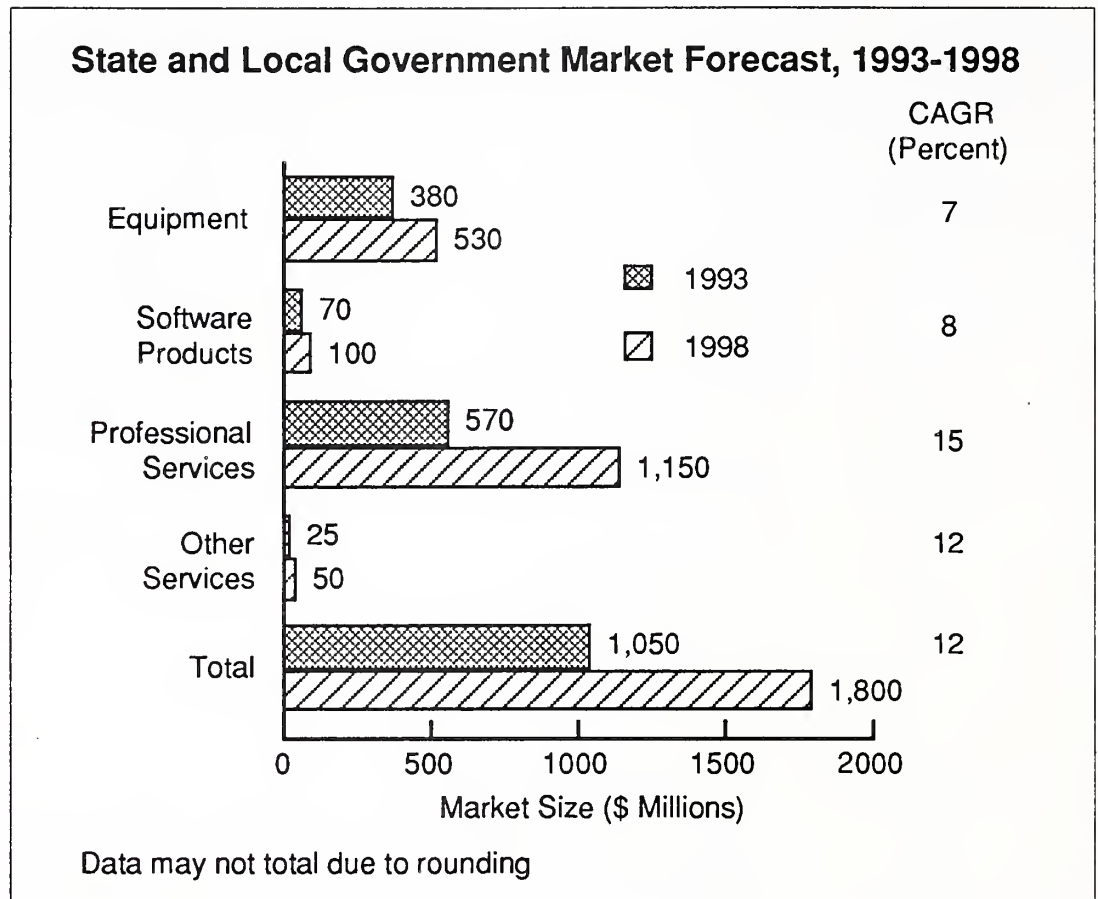


EXHIBIT IV-42

**State and Local Government Market
Examples of SI Vendors and Clients During the Recent Past**

Vendor	Client	Size (\$ Million)
Ernst & Young	N.Y. Urban Dev. Corp.	Proprietary
Andersen Consulting	Texas State Government	2.6
Andersen Consulting	Montana	15.5
IBM/Mentor	Jefferson County, Kentucky	Proprietary
CSC	N.Y. Dept. of Social Services	149
EDS	Chicago	40
Oracle	Ohio	3
Cincinnati Bell	Virginia	2

P**Miscellaneous Services**

As shown in Exhibit IV-43, the pick up in the economy and construction business in 1993 were positive factors stimulating the use of SI in the miscellaneous market.

- Construction firms are becoming more interested in automation and the use of network applications as a means of controlling expenditures and work activities.
- Problems, including crop damage, though unfortunate for many agricultural producers, offered opportunities for others and encouraged further use of automation in firms with financial means.

EXHIBIT IV-43**Market Factors Reported for the Miscellaneous Market
by SI Vendors****Positive Factors**

- Pick up in the economy in 1993
- Increase in-house construction
- Need for more use of automated systems and networks
- Reduced output for some areas of agricultural production

Negative Factors

- Small size of vertical market
- Weakness in some agricultural markets
- Limited number of large companies
- Competition from turnkey systems

The total size of the miscellaneous market is very small as shown in Exhibit IV-44. Although it has a relatively high CAGR for the next five years, it will remain small and have limited appeal to vendors. Nevertheless, the market does have some of the leading vendors competing for business as shown in Exhibit IV-45.

EXHIBIT IV-44

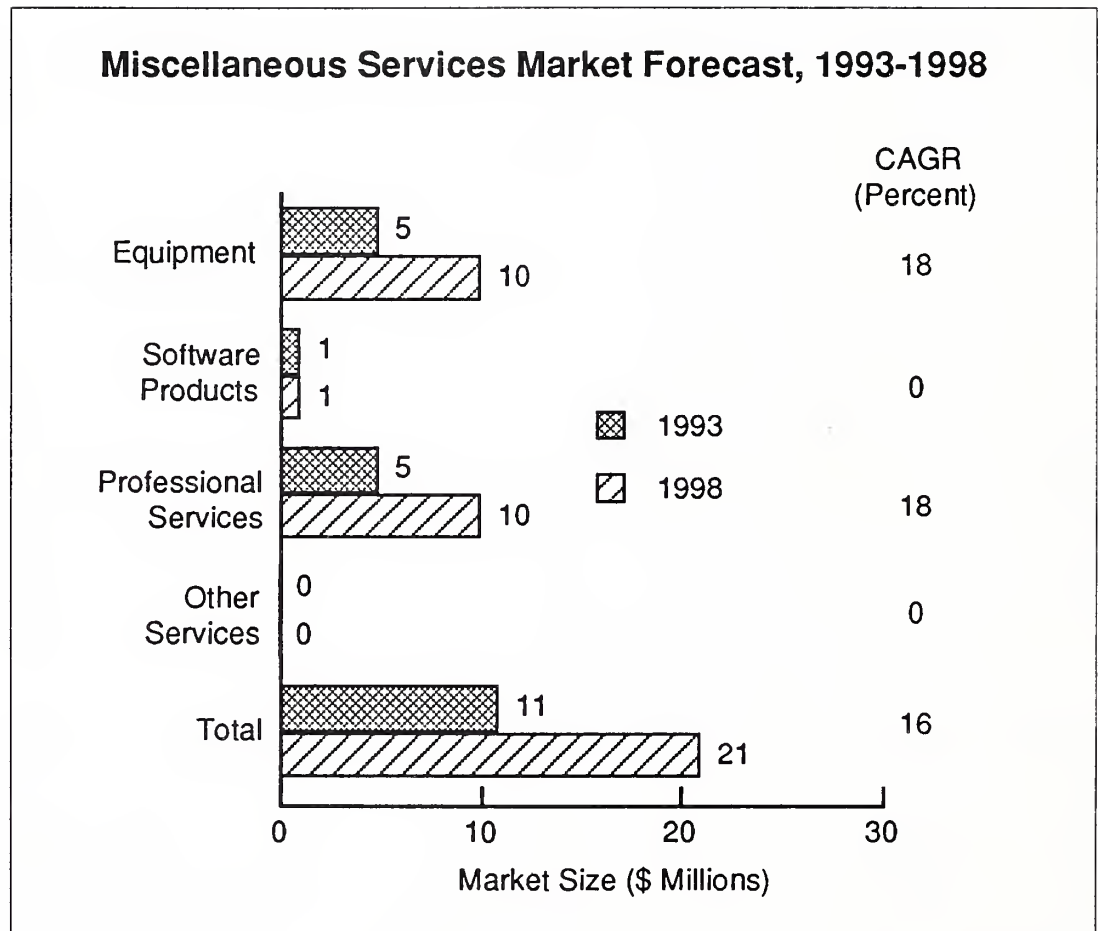
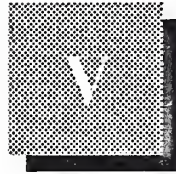


EXHIBIT IV-45

**Miscellaneous Services Market
Examples of SI Vendors and Clients During the Recent Past**

Vendor	Client	Size (\$ Million)
EDS	Meridith Construction	10 SI and SO
SHL	Fluor Daniel	10 SI and SO
AT&T	BK&K Construction	Proprietary



Conclusions and Recommendations

A

Opportunities Offered by SI

SI offers an opportunity to increase revenues and earnings in the IT industry for vendors who have been specializing in other delivery modes.

- Some of the vertical markets where SI is offered are growing at over 20% annually as noted in Exhibit V-1.

EXHIBIT V-1

Conclusions

- SI is growing at a CAGR of more than 20% in some vertical markets
 - Major SI vendors have maintained high rates of growth for revenues and earnings
 - SI provides an opportunity to gain a mark-up on other IT products and services
 - Major SI vendors are considered to be sources of information and aid on the introduction of new information technology (they are "Agents of Change")
 - SI vendors are also sources of information on development methodologies, tools and techniques
 - There are significant risks in SI projects
 - SI vendors must constantly research and introduce new services and/or enter new markets to maintain growth
-
- The ability to offer the fast growing service of systems operations depends, to a great extent, on SI capabilities as EDS and CSC can testify.

- An opportunity to gain meaningful earnings from application software products may be more available to SI vendors such as Andersen Consulting, AMS and TSC than to many software product vendors.

SI vendors may also make more from hardware products than manufacturers because they are essentially making a mark-up on these products. The ability to influence the use of hardware has made SI a necessary service for most computer manufacturers.

SI vendors, more than any other IT vendors, are now being recognized as sources of information on new technology as well as on business changes including re-engineering that can lead to information systems work.

SI vendors are also considered to be highly qualified in the use of methodologies as well as in techniques and tools used for systems development. Many are engaged in research that will enhance these capabilities.

Large SI vendors will tend to increase their dominant position in the use of information services in larger companies. They will be contacted first in regard to new plans or IT problems, and will turn to other suppliers, when necessary, to provide products and services to implement a solution.

B

Challenges of SI

Exhibit V-1 also points out SI firms are exposed to ongoing risks in their activities. Not only are they exposed to losses of revenue and possible law suits if projects are not successful, they are also under pressure to constantly upgrade and improve their solutions to complex problems as EDS and Unisys have done in banking and CSC has done in manufacturing.

- SI vendors must maintain awareness of new IT developments and techniques that could offer improved solutions in their specialized market areas. Competitors could make use of new developments to enter their markets if vendors delay.
- Leading SI vendors must also constantly look for new business approaches or technology that will enable them to enter new markets or expand their penetration of existing markets (as Andersen Consulting has done in developing capabilities in imaging systems to further penetrate the airline and pharmaceutical industries).

The desire to maintain a rapid rate of growth, together with high margins, makes it necessary to consider introducing additional services or plunging into new market niches. Some new directions could prove to be costly mistakes, however.

- Application approaches, including software products developed for a company in a new market niche, might not be suitable to other companies in this niche. Some SI vendors rely too greatly on their own ideas about markets.
- The desire to make new services and upgraded application solutions available as rapidly as possible, exposes SI vendors to a high level of risk with important clients. It is not surprising that a number of SI vendors are taking steps to control and improve quality.

C

Recommendations for SI Vendors

Constant research should be carried out in a number of areas as suggested by Exhibit V-2.

- Vendors must have ongoing programs or research for analyzing new technology to determine if it offers opportunities to improve application systems in target vertical markets.
- Vendors must also stay aware of competitor activities in their target markets to find out what IT improvements or new functional capabilities are being offered.

EXHIBIT V-2

Recommendations

- Research on new technology and application solutions must be more formerly planned
- Ongoing research is needed on market needs before commitments are made
- There should be inventories made of technical skills
- Sources of additional skills should be investigated
- Ongoing research is necessary to improve development quality as well as speed

SI vendors must also constantly evaluate market areas to determine which ones offer most opportunities in relation to future planning. The development of a new application solution should be preceded or at least accompanied with research on the relative importance of needs in the market area of interest.

SI vendors must also have plans to train or acquire the technical talents necessary to support their plans.

- Clients expect an SI vendor to be prepared to address technical needs on an immediate basis.
- Firms that provide temporary personnel with specialist knowledge report emergency requests from SI firms unable to meet the requests of clients or project schedules because of the shortage of skilled personnel.

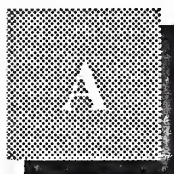
SI vendors must also engage in research on methodology along with tools and development techniques that can improve productivity and quality for application development.

- This can raise the level of development within the SI firm and make it possible to deliver better products more rapidly.
- It can also provide an opportunity to market capabilities for application development to clients.

An SI firm should consider offering training and consulting assistance for client/server systems. These systems are growing without overall plans in many companies, and aid is being sought.

- There is a market for the review of potential problems in education and consulting that can result from the use of client/server technology as well as the opportunities it offers.
- Training and consulting assistance for this technology may also provide a vendor with information on user plans to aid in identifying opportunities.

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Definition of Terms

A

Introduction

INPUT's *Definition of Terms* provides the framework for all INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit A-1 is also used in Europe and the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year, INPUT reviews its industry structure and makes changes if they are required. When changes are made, they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

B

Overall Definitions and Analytical Framework

1. Information Services

Information Services are computer/telecommunications-related products and services oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Use of vendor-provided computer processing services to develop or run applications or provide services such as disaster recovery or data entry (called *Processing Services*)
- A combination of computer equipment, packaged software and associated support services that meet an application systems need (called *Turnkey Systems*)
- Packaged software products, including systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- The combination of products (software and equipment) and services where the vendor assumes total responsibility for the development of a custom integrated solution to an information systems need (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services that support the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange (called *Network Applications*)
- Services that support the access and use of public and proprietary information such as on-line databases and news services (called *Electronic Information Services*)
- Services that support the operation of computer and digital communication equipment (called *Equipment Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is part of an overall service offering such as a turnkey system, a systems operations contract or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., electronic data interchange services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems related to the distribution channels for various categories of services:

- Double-counting, occurs by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, occurs when sales to users go through indirect channels such as mail order retailers

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that are part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Noncaptive Information Services User Expenditures are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures that constitute the information services market analyzed by INPUT and are included in INPUT forecasts.

3. Delivery Modes

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the nine delivery modes defined by INPUT, six are considered primary products or services:

- Processing Services
- Network Services
- Professional Services
- Applications Software Products
- Systems Software Products
- Equipment Services

The remaining three delivery modes represent combinations of these products and services, combined with equipment, management and/or other services:

- Turnkey systems
- Systems operations
- Systems integration

Section C describes the delivery modes and their structure in more detail.

4. Market Sectors

Market Sectors or markets are groupings or categories of the buyers of information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called "industry-specific" markets.

- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called “cross-industry” markets.
- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line database market.

Specific market sectors used by INPUT are defined in Section E, below.

5. Trading Communities

Information technology is playing a major role in re-engineering, not just companies, but the value chain or *Trading Communities* in which these companies operate. This re-engineering is resulting in electronic commerce emerging where interorganizational electronic systems facilitate the business processes of the trading community.

- A trading community is the group or organizations—commercial and noncommercial—involved in producing goods or services.
- Electronic commerce and trading communities are addressed in INPUT’s EDI and Electronic Commerce Program.

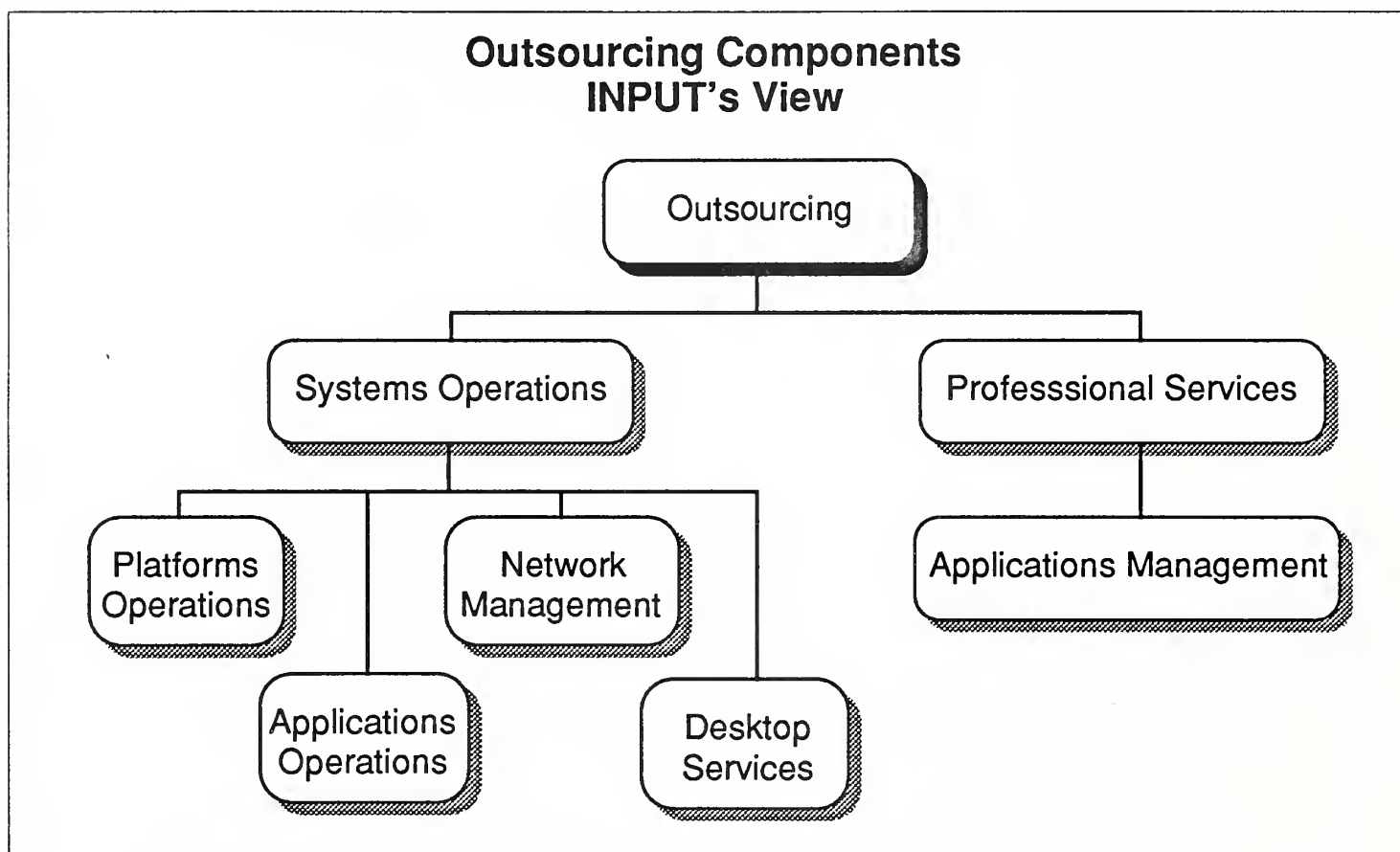
6. Outsourcing

Over the past few years a major change has occurred in the way clients are buying some information services. The shift has been labeled *outsourcing*.

INPUT views outsourcing as a change in the form of the client/vendor relationship. Under an outsourcing relationship, all or a major portion of the information systems function is contracted to a vendor in a long-term relationship. The vendor is responsible for the performance of the function.

INPUT considers the following submodes to be outsourcing-type relationships and in aggregate to represent the outsourcing market. See Exhibit A-1. Complete definitions are provided in Section C of this document. INPUT provides these forecasts as part of the corresponding delivery modes.

EXHIBIT A-1



- *Platform Systems Operations* - The vendor is responsible for managing and operating the client's computer systems.
- *Applications System Operations* - The vendor is responsible for developing and/or maintaining a client's applications as well as operating the computer systems.
- *Network Management* - The vendor assumes full responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client.

- *Applications Management / Maintenance* - The professional services vendor has full responsibility for developing and/or maintaining some or all of the applications systems that a client uses to support business operations. The services are provided on a long-term, contractual basis.
- *Desktop Services* - The vendor assumes responsibility for the deployment, maintenance and connectivity between personal computers and/or intelligent workstations in the client organization. The services may also include performing the help-desk function. The services are provided on a long-term, contractual basis.

C

Delivery Modes and Submodes

Exhibit A-2 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

1. Software Products

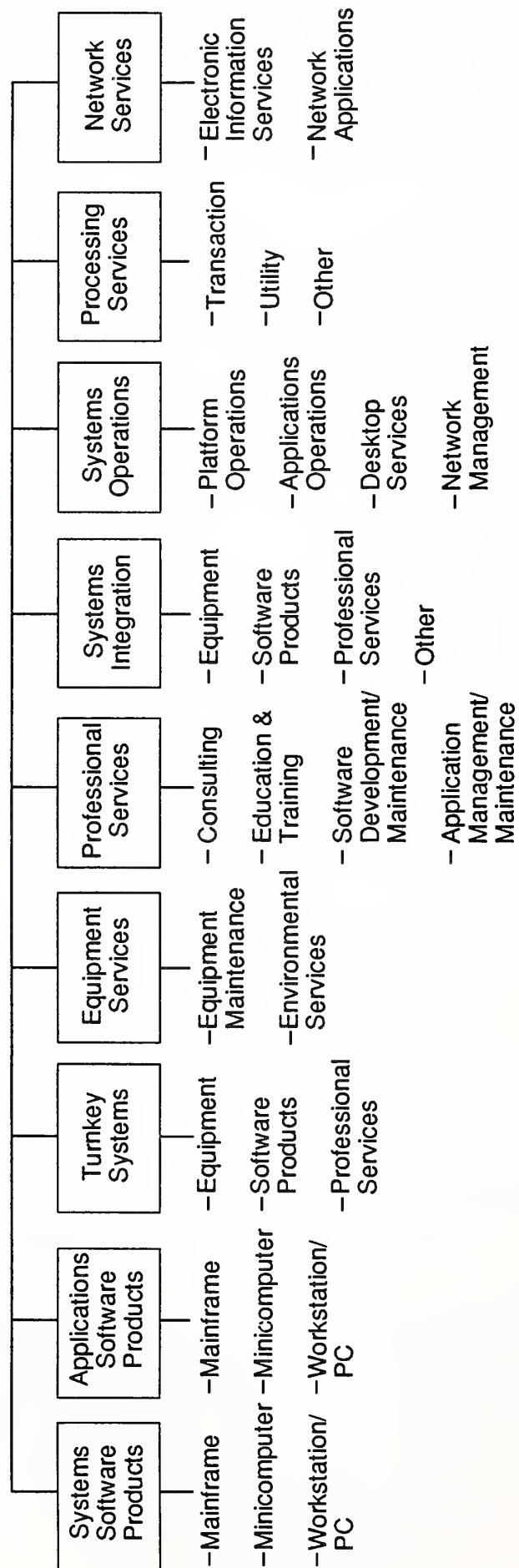
INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if part of the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are also counted as professional services, provided such fees are charged separately from the price of the software product itself.

EXHIBIT A-2

Information Services Industry Structure—1993

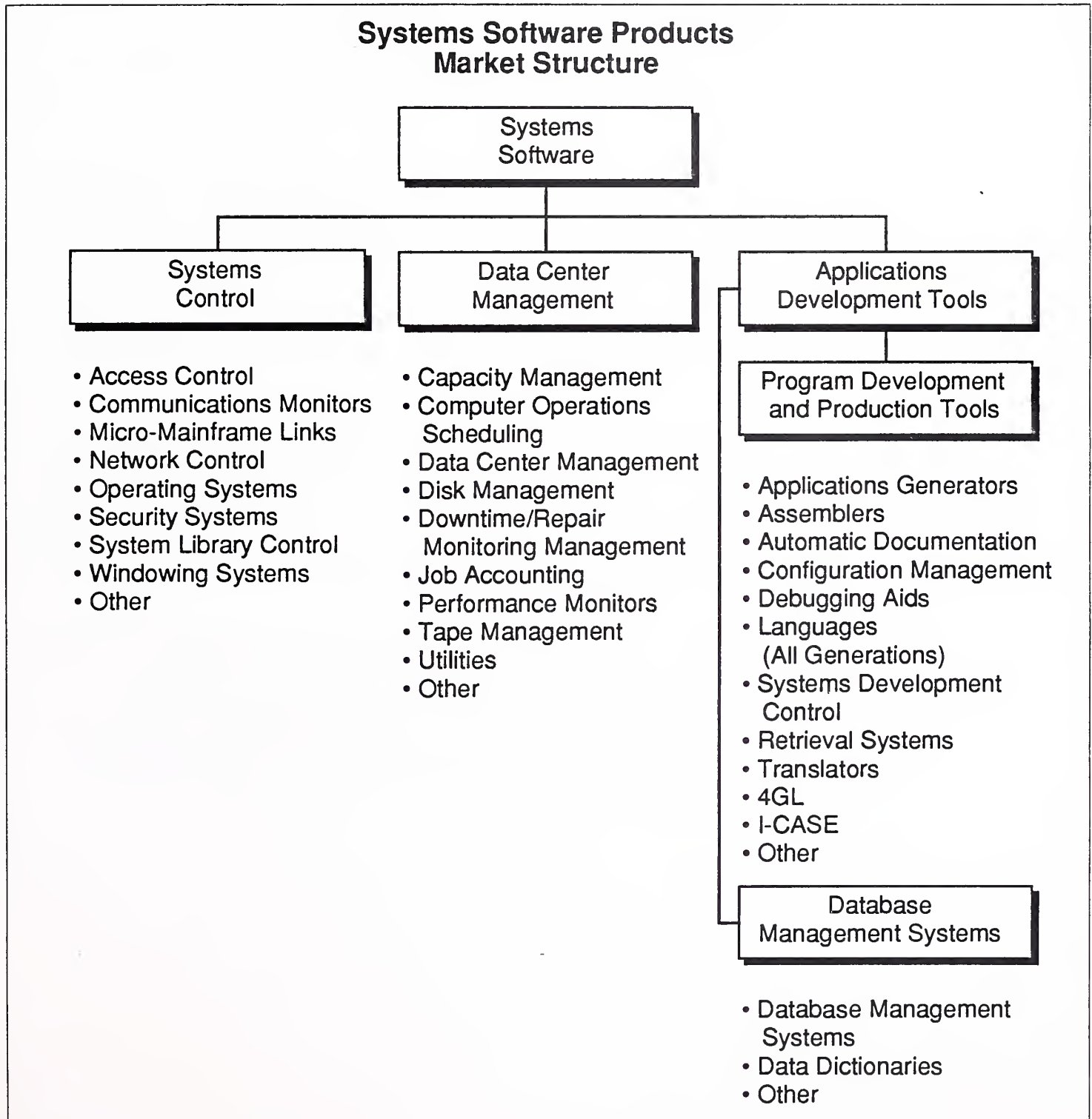


Source: INPUT

a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes. See Exhibit A-3.

EXHIBIT A-3



- *Systems Control Products* - Software programs that manage computer system resources and control the execution of programs. These products include operating systems, emulators, network control, library control, windowing, access control and spoolers.
- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities and capacity management.
- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing and related functions. Included are traditional programming languages, 4GLs, data dictionaries, database management systems, report writers, project control systems, CASE systems and other development productivity aids.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

b. Applications Software Products

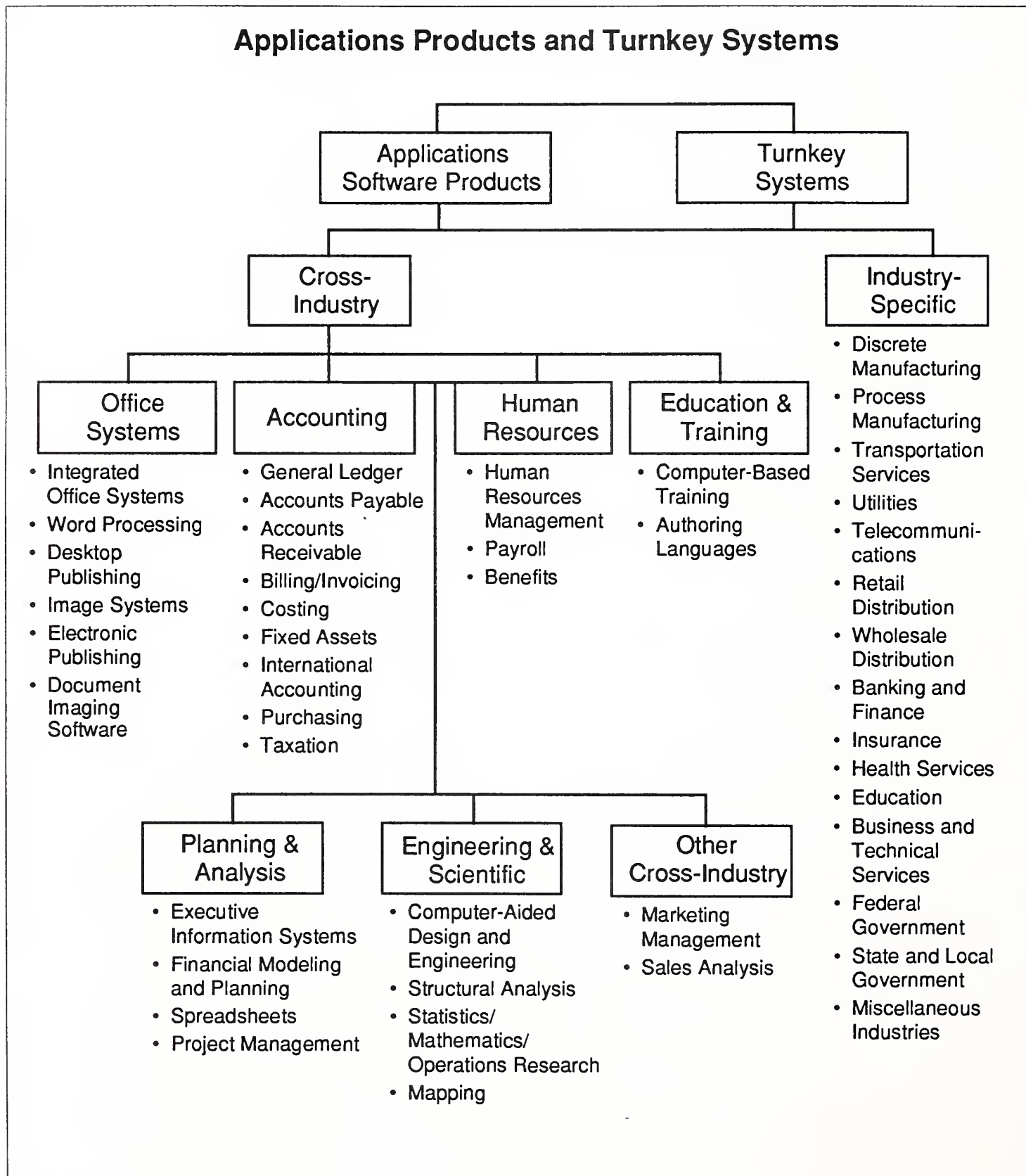
Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two groups of market sectors. (See Exhibit A-4.)

- *Industry Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.
- *Cross-Industry Applications Software Products* - Software products that perform a specific function applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

EXHIBIT A-4

Applications Products and Turnkey Systems



2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software and packaged applications software, into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and professional services provided. INPUT categorizes turnkey systems into two groups of market sectors as it does for applications software products. (See Exhibit A-4.)

Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems use standard computers and do not include specialized hardware such as word processors, cash registers, process control systems or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR)*: A VAR adds value to computer hardware and/or software and then resells it to a user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services, software support and applications upgrades.

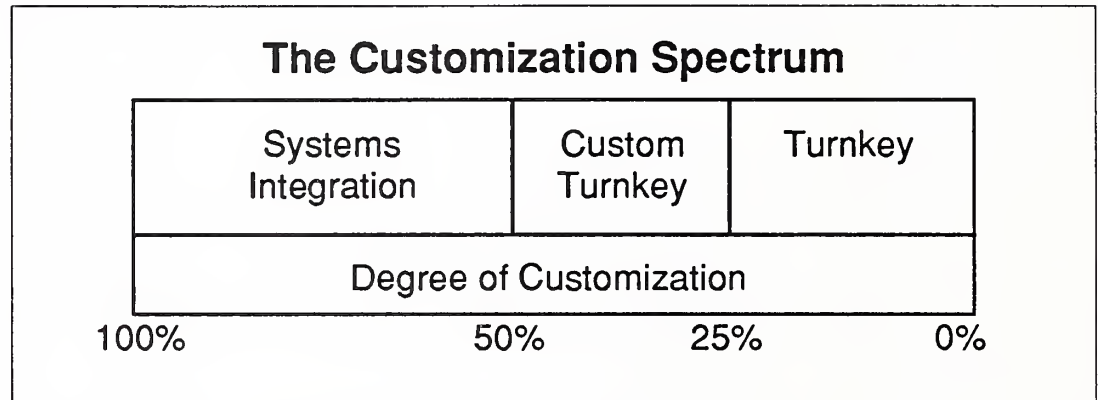
Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products

- **Professional services** - services to install or customize the system or train the user, provided as part of the turnkey system sale

Exhibit A-5 contrasts turnkey systems with systems integration. Turnkey systems are based on available software products a vendor may modify to a modest degree.

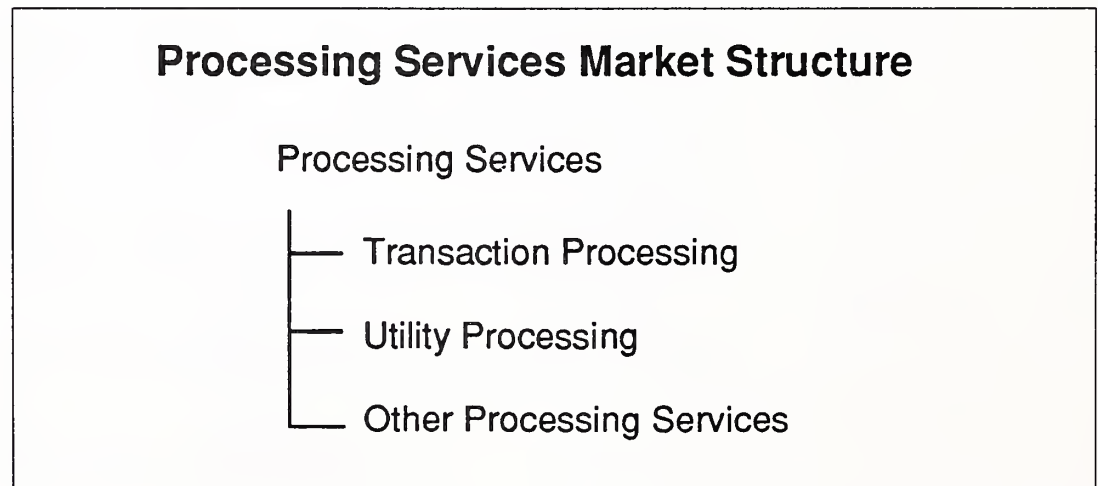
EXHIBIT A-5



3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing and “other” processing services. See Exhibit A-6.

EXHIBIT A-6



- **Transaction Processing** - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process specific applications and update client databases. The application software is typically provided by the vendor.

- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), enabling clients to develop and/or operate their own programs or process data on the vendor's system.
- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

4. Systems Operations

Systems operations, as a delivery mode, was introduced in the 1990 Market Analysis and Systems Operations programs. Previously called Facilities Management, this delivery mode was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1992, the submodes have been defined as follows.

Systems operations involves the operation and management of all or a significant part of the client's information systems functions under a long-term contract. These services can be provided in either of four distinct submodes where the difference is whether the support of applications, as well as data center operations, is included.

- *Platform systems operations* - The vendor manages and operates the computer systems to perform the client's business functions, without taking responsibility for the client's application systems.
- *Applications systems operations* - The vendor manages and operates the computer systems to perform the client's business functions, and is also responsible for maintaining, or developing and maintaining, the client's application systems.

- *Network Management* - The vendor assumes responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client. A network management outsourcing contract may include only the management services or the full costs of the communications services and equipment plus the management services.
- *Desktop Services* - The vendor assumes responsibility for the deployment, maintenance and connectivity among the personal computers and/or workstations in the client organization. The services may also include performing the help-desk function. Equipment, as well as services, can be part of a desktop services outsourcing contract.

Note: This type of client service can also be provided through traditional professional services where the contractual criteria of outsourcing are not present.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the client's information systems environment (equipment, networks, applications systems), either at the client's site or the vendor's site.

Note: In the federal government market, systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation development requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall

management of a systems integration contract and is the single point of contact and is responsible to the buyer for the delivery of the specified system function, on schedule and at the contracted price. (Refer to Exhibit A-7.)

The components of a systems integration project are the following:

- *Equipment* - information processing and communications equipment required to build the systems solution. This component may include custom, as well as off-the-shelf equipment, to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.
- *Software products* - prepackaged applications and systems software products.
- *Professional services* - the value-added component that adapts the equipment and develops, assembles or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, implement, and if included in the contract, operate an information system, including consulting, program/project management, design and integration, software development, education and training, documentation and systems operations and maintenance.
- *Other services* - most systems integration contracts include other services and product expenditures that are not classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies and other items required for a smooth development effort.

EXHIBIT A-7

Products/Services in Systems Integration Projects

Equipment

- Information systems
- Communications

Software Products

- Systems software
- Applications software

Professional Services

- Consulting
 - Feasibility and trade-off studies
 - Selection of equipment, network and software
- Program/project management
- Design/integration
 - Systems design
 - Installation of equipment, network, and software
 - Demonstration and testing
- Software development
 - Modification of software packages
 - Modification of existing software
 - Custom development of software
- Education/training and documentation
- Systems operations/maintenance

Other Miscellaneous Products/Services

- Site preparation
- Data processing supplies
- Processing/network services
- Data/voice communication services

6. Professional Services

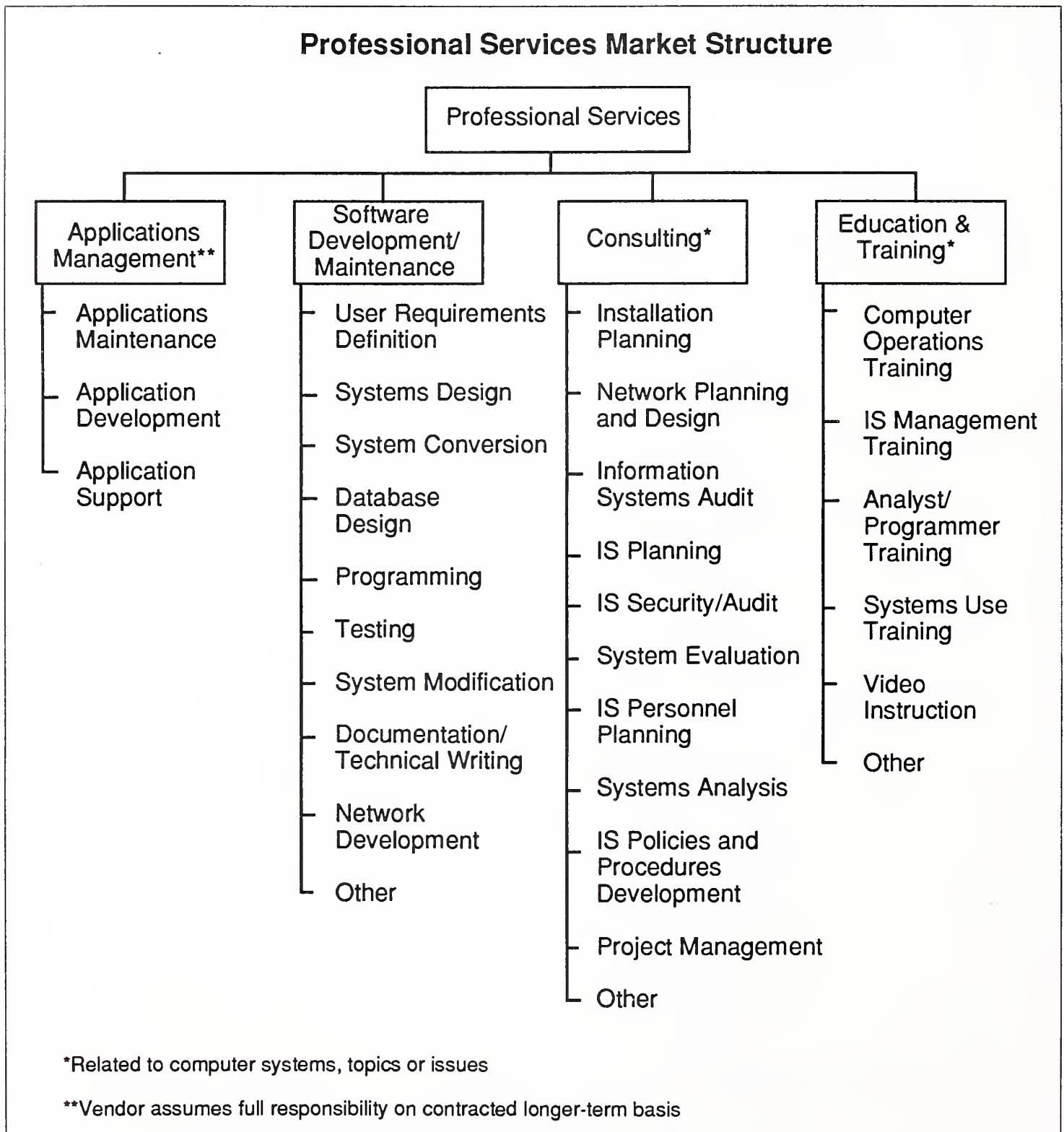
This category includes four submodes: consulting, education and training, software development and applications management. Exhibit 8 provides additional detail.

- *Consulting:* Services include management consulting (related to information systems), information systems re-engineering, information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of the information system, including equipment, software, networks and systems operations.
- *Education and Training:* Services that provide training and education or the development of training materials related to information systems and services for the information systems professional and the user. Included are computer-aided instruction, computer-based education and vendor instruction of user personnel in operations, design, programming and documentation. Education and training provided by school systems is not included. General education and training products are included as a cross-industry market sector.
- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation and implementation of software performed on a custom basis. Conversion and maintenance services are also included.
- *Applications Management:* The vendor has full responsibility for maintaining and upgrading some or all of the application systems a client uses to support business operations and may develop and implement new application systems for the client.

An applications management contract differs from traditional software development in the form of the client/vendor relationship. Under traditional software development services, the relationship is project-based. Under applications management, it is time and function-based.

These services may be provided in combination or separately from platform systems operations.

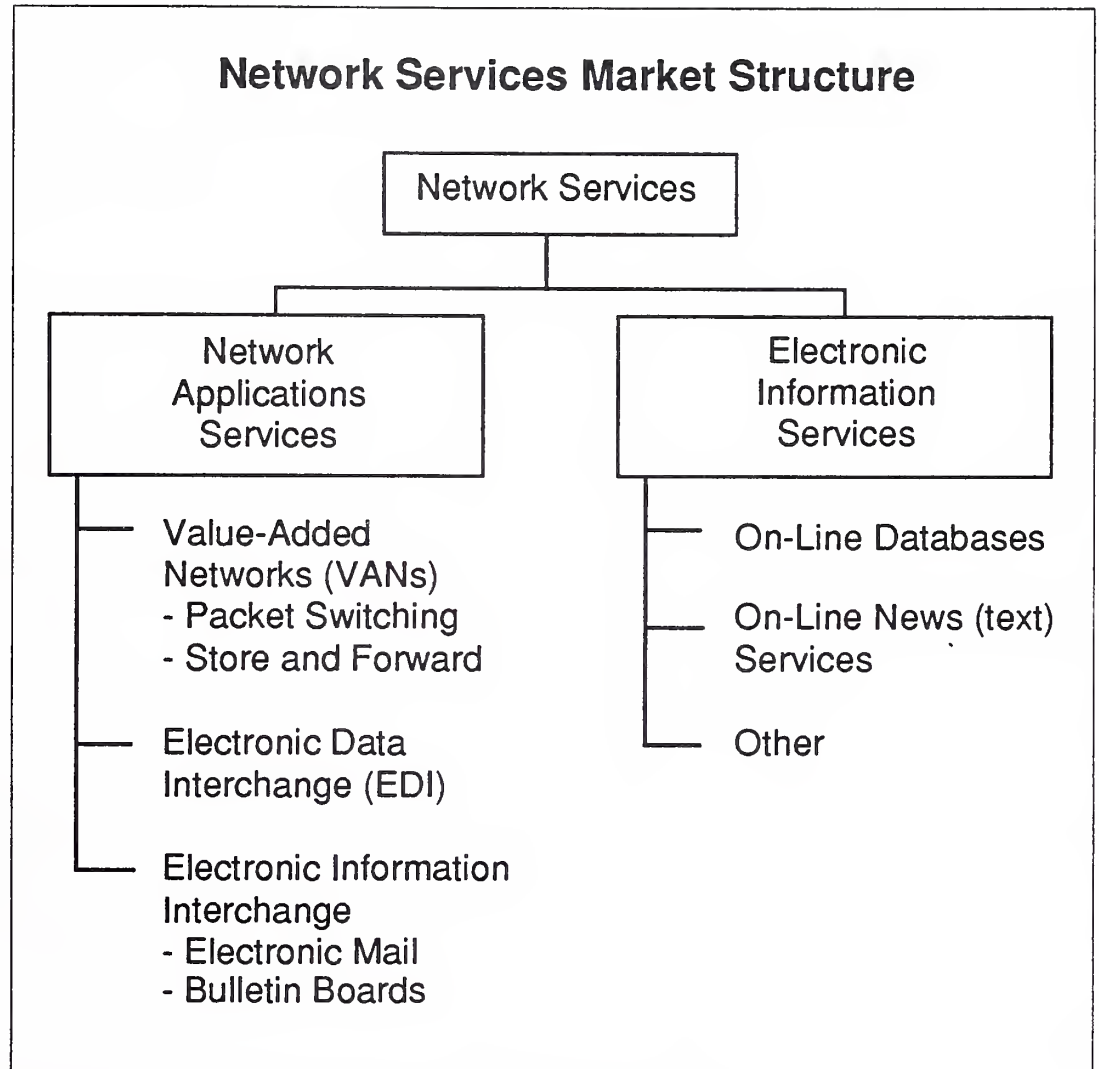
EXHIBIT A-8



7. Network Services

Network services are a variety of telecommunications-based functions and operations. Network service includes two sub-modes, as shown in Exhibit A-9.

EXHIBIT A-9

**a. Electronic Information Services**

Electronic information services are databases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers.

Users inquire into and extract information from the databases. They may load extracted data into their own computer systems; the vendor does not provide data processing or manipulation capability as part of the electronic information service and users cannot update the vendor's databases. However, the vendor may offer other services (network applications or processing services) that do offer processing or manipulation capability.

The two kinds of electronic information services are:

- *On-line Databases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.
- Unstructured, primarily textual information on people, companies, events, etc. These are often news services.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

b. Network Applications

Value-Added Network Services (VAN Services) - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

Electronic Data Interchange (EDI) - Application-to-application electronic exchange of business data between trade partners or facilitators using a telecommunications network.

Electronic Information Interchange- The transmission of messages across an electronic network managed by a services vendor, including electronic mail, voice mail, voice messaging, and access to Telex, TWX and other messaging services. This also includes bulletin board services.

8. Equipment Services

- The equipment services delivery mode includes two submodes. Both deal with the support and maintenance of computer equipment.
- *Equipment Maintenance* - Services provided to repair, diagnose problems and provide preventive maintenance both on-site and off-site for computer equipment. The costs of parts, media and other supplies are excluded. These services are typically provided on a contract basis.
- *Environmental Services* - Composed of equipment and data center-related special services such as cabling, air conditioning and power supply, equipment relocation and similar services.

D

Computer Equipment

These definitions have been included to provide the basis for market segmentation in the software products markets.

- *Computer Equipment* - Includes all computer and telecommunications equipment that can be separately acquired with, or without, installation by the vendor and not acquired as part of an integrated system. Unless otherwise noted, in an INPUT forecast, computer equipment is only included as part of the purchase of services or software products (e.g., turnkey systems and systems integration).
- *Peripherals* - Includes all input, output, communications and storage devices (other than main memory) that can be channel connected to a processor, and generally cannot be included in other categories such as terminals.
- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors and analog-to-digital converters.

- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics and plotters
- *Communication Devices* - Includes modem, encryption equipment, special interfaces and error control
- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits) and bubble and optical memories
- *Computer Systems* - Includes all processors from personal computers to supercomputers. Computer systems may require type- or model-unique operating software to be functional, but this category excludes applications software, peripheral devices and processors or CPUs, not provided as part of an integrated (turnkey) system.
- *Personal computers* - Smaller computers using 8-, 16-, or 32-bit computer technology. Generally designed to sit on a desktop and are portable for individual use. Price generally less than \$5,000.
- *Workstations* - High-performance, desktop, single-user computers often employing Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as database access, file storage and back-up, remote communications and peripheral support. These products usually cost from \$5,000 to \$15,000.
- *Minicomputer or midsize computers* - Minicomputers are generally priced from \$15,000 to \$350,000. Many of the emerging client/server computers are in this category.
- *Mainframe or large computers* - Traditional mainframe and supercomputers costing more than \$350,000.
- *Client/server computing* - Client/server is an architecture that assembles applications software and databases, systems software and computer and networking equipment into a usable form for the purpose of leveraging information technology investments.

Broadly defined, it can include any kind of server, such as file servers and network servers, accessed by any kind of client, including a nonintelligent terminal. INPUT has elected to use the narrower and newer definition—application and data processing shared between a client and a server. It is through the act of sharing that the greatest benefit is derived in terms of leveraging information technology investments. It is also the cause of the greatest change for vendors and users.

E

Sector Definitions

1. Industry Sector Definitions

INPUT structures the information services market into industry sectors such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) code system. The specific industries (and their SIC codes) included under these industry sectors are detailed in Exhibit A-10.

INPUT includes all delivery modes, except systems software products and equipment services, in industry market sectors. See Exhibit 9 and section E-3 (Delivery Mode Reporting by Sector).

Note: SIC code 88 is Personal Households. INPUT does not currently analyze or forecast information services in this market sector.

EXHIBIT A-10

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetallic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete products
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (including airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (including 472x, arrangement of passenger transportation)

EXHIBIT A-10 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Telecommunications	48xx	Communications
Utilities	49xx	Electric, gas and sanitary services
Retail Distribution	52xx 53xx 54xx 55xx 56xx 57xx 58xx 59xx	Building materials General merchandise stores Food stores Automotive dealers, gas stations Apparel and accessory stores Home furniture, furnishings and accessory stores Eating and drinking places Miscellaneous retail
Wholesale Distribution	50xx 51xx	Wholesale trade - durable goods Wholesale trade - nondurable goods
Banking and Finance	60xx 61xx 62xx 67xx	Depository institutions Nondepository credit institutions Security and commodity brokers, dealers, exchanges and services Holding and other investment offices
Insurance	63xx 64xx	Insurance carriers Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

EXHIBIT A-10 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Business Services	65xx	Real estate
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	73xx	Business services (except hotel reservation services in 7389)
	7389x	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	81xx	Legal services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organizations
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors

2. Cross-Industry Sector Definitions

INPUT has identified seven cross-industry market sectors. These sectors or markets involve multi-industry applications such as human resource systems, accounting systems, etc.

- In order to be included in an industry sector, the service or product delivered must be specific to that sector only. If a service or product is used in more than one industry sector, it is counted as cross-industry.
- INPUT only includes the turnkey systems, applications software products and transaction processing services in the cross-industry sectors.

The seven cross-industry markets are:

Accounting - consists of applications software products and information services that serve such functions as:

- General ledger
 - Financial management
 - Accounts payable
 - Accounts receivable
 - Billing/invoicing
 - Fixed assets
 - International accounting
 - Purchasing
 - Taxation
 - Financial consolidation
- Excluded are accounting products and services directed to a specific industry, such as tax processing services for CPAs and accountants within the business services industry sector.

Human Resources - consists of application solutions purchased by multiple industry sectors to serve the functions of human resources management and payroll. Examples of specific applications within these two major functions are:

- Employee relations
- Benefits administration

- Government compliance
- Manpower planning
- Compensation administration
- Applicant tracking
- Position control
- Payroll processing

Education and Training - consists of education and training for information systems professionals and users of information systems delivered as a software product, turnkey system or through processing services. The market for computer-based training tools for employee training on any subject is also included.

Office Systems consists of the following six categories:

Integrated Office Systems (IOSs) - IOSs integrate the applications that perform common office tasks. Typically, these tasks include the following core applications, all of which are accessed from the same terminal, microcomputer or workstation:

- Electronic mail
- Decision support systems
- Time management
- Filing systems

IOSs enable office workers to utilize applications resident on a number of hosts or servers, thus creating a corporate communication environment through integrating line-of-business software with personal software productivity tools. IOSs capitalize on the cross-platform architectures of major vendors such as IBM, Data General, Digital, Hewlett-Packard and NCR.

Work flow and groupware products are also included within the IOS definition.

Word Processing - Word processing is the most common microcomputer application and is a basic application within the office systems sector. Word processing addresses several levels of functionality, from the production of simple correspondence to large document generation where people within different departments have input.

Desktop Publishing (DTP) - Desktop publishing refers to the page-design software programs that allow small and mid-sized organizations to publish printed documents (brochures, catalogs, newsletters, reports, etc.) from the desktop. The primary functions of DPT software include the manipulation of the following functions:

- Layout and design of columns.
- Text manipulation (font type).
- Graphic manipulation.
- Print Control (color type, paper type)

Electronic Publishing - Electronic publishing includes composition, printing and editing software for documents containing multiple typefaces and graphics including charts, diagrams, computer-aided design (CAD) drawings, line art and photographs. Electronic publishing products may also have different data formats such as text, graphs, images, voice and video.

The fundamental difference between electronic publishing and desktop publishing is that electronic publishing regulates document management and control from a single point regardless of how many authors/locations work on a document. Desktop publishing (DTP) on the other hand, is considered a personal productivity tool and is generally a lower-end product residing on a personal computer.

Graphics - Graphics packages used for presentations or free-hand drawings and/or are ancillary to desktop publishing are part of office systems. Thus, the graphics component of office systems sector includes the following elements:

Presentation graphics represent the bulk of office systems graphics. Most presentations involve a combination of graphs and text. They are used to communicate a series of messages to an audience rather than to analyze data.

Paint and line art drawing programs are used for illustrations while page layout programs are used to integrate text and graphics.

Electronic form programs allow users to create and print forms in-house. Some applications work with OCR scanners allowing users to scan pictures and logos directly on the forms.

Document Imaging Software - The software that allows users to manipulate (store, retrieve, print) images that have been scanned from paper documents. The applications imaging software generates include: full text retrieval, document management and database management. Document imaging software is a component of an imaging system. Hardware components of imaging systems include: scanners, image servers, workstations, optical drives, printers and storage devices.

Engineering and Scientific encompasses the following applications:

- Computer-aided design and engineering (CAD and CAE)
- Structural analysis
- Statistics/mathematics/operations research
- Mapping/GIS
- Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from the cross-industry sector as it is specific to the manufacturing industries. CAD or CAE dedicated to integrated circuit design is also excluded because it is specific to the semiconductor industry.

Planning and Analysis consists of software products and information services in four application areas:

- Executive Information Systems (EIS)
- Financial modeling or planning systems
- Spreadsheets
- Project management

Other encompassed marketing/sales and electronic publishing application solutions.

- Sales and marketing includes:
 - Sales analysis
 - Marketing management
 - Demographic market planning models

3. Delivery Mode Reporting by Sector

This section describes how the delivery mode forecasts relate to the market sector forecasts. Exhibit A-11 summarizes the relationships.

- *Processing services* - The transaction processing services submode is forecasted for each industry and cross-industry market sector. The utility and other processing services submodes are forecasted in total market in the general market sector.
- *Turnkey systems* - Turnkey systems is forecasted for the fifteen industry and seven cross-industry sectors. Each component of turnkey systems is forecasted in each sector.

EXHIBIT A-11

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	General
Processing Services	Transaction Utility Other	X	X	X X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform Applications	X X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications Electronic Information Services	X X		X
Systems Software Products				X
Equipment Services				X

- *Applications software products* - The applications software products delivery mode is forecasted for the fifteen industry and seven cross-industry sectors. In addition, each forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.
- *Systems operations* - Each of the systems operations submodes is forecasted for each of the 15 industry sectors.

- *Systems integration* - Systems integration and each of the components of systems integration are forecasted for each of the 15 industry sectors.
- *Professional services* - Professional services and each of the submodes is forecasted for each of the 15 industry sectors.
- *Network services* - The network applications submode of network services forecasted for each of the 15 industry sectors.

Industry and cross-industry electronic information services are forecast in relevant market sectors. The remainder of electronic information services is forecasted, in total, for the general market sector.

- *Systems software products* - Systems software products and its submodes are forecasted in total for the general market sector. Each submode forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.
- *Equipment services* - Equipment services and its submodes are forecasted, in total, in the general market sectors.

F

Vendor Revenue and User Expenditure Conversion

The size of the information services market may be viewed from two perspectives: vendor (producer) revenues and user expenditures. INPUT defines and forecasts the information services market in terms of user expenditures. User expenditures reflect the markup in producer sales when a product, such as software, is delivered through indirect distribution channels (such as original equipment manufacturers (OEMs), retailers and distributors). The focus on user expenditure also eliminates the double counting of revenues that would occur if sales were tabulated for both producer (e.g., Lotus) and distributor (e.g., ComputerLand).

For most delivery modes, vendor revenues and user expenditures are fairly close. However, there are some areas of significant difference. Many microcomputer software products, for example, are marketed through distribution channels. To capture the value added through these distribution channels, adjustment factors are used to convert estimated information services vendor revenues to user expenditures.

For some delivery modes, including software products, systems integration and turnkey systems, there is a significant volume of intraindustry sales. For example, systems integrators purchase software and subcontract the services of other professional services vendors. Turnkey vendors incorporate purchased software into the systems they sell to users.

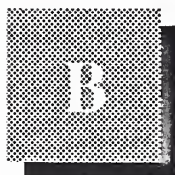
To account for such intraindustry transactions, INPUT uses conversion ratios to derive the estimate of user expenditures.

Exhibit A-12 summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to user expenditure (market size) figures for each delivery mode.

EXHIBIT A-12

**Vendor Revenue to
User Expenditure Conversion**

Delivery Mode	Vendor Revenue Multiplier
Applications Software Products	1.18
Systems Software Products	1.10
Systems Operations	0.95
Systems Integration	0.95
Professional Services	0.99
Network Services	0.99
Processing Services	0.99
Turnkey Systems	0.95
Equipment Services	0.99



SI Forecast and Reconciliation

EXHIBIT B-1

U.S. Systems Integration Market, 1993-1998

Delivery Modes	1992 (\$M)	Growth 92-93 (%)	1993 (\$M)	1994 (\$M)	1995 (\$M)	1996 (\$M)	1997 (\$M)	1998 (\$M)	CAGR 93-98 (%)
Systems Integration	9,265	9	10,076	11,418	13,073	14,966	17,109	19,361	14
-Equipment	3,869	22	4,707	5,283	5,988	6,791	7,637	8,543	13
-Software Products	685	12	767	885	1,035	1,197	1,373	1,544	15
-Professional Services	4,371	-4	4,210	4,801	5,530	6,380	7,419	8,522	15
-Other	340	15	392	449	520	599	681	752	14

EXHIBIT B-2

Systems Integration U.S. Market Forecast by Industry Sector, 1993-1998

Delivery Modes	1992 (\$M)	Growth 92-93 (%)	1993 (\$M)	1994 (\$M)	1995 (\$M)	1996 (\$M)	1997 (\$M)	1998 (\$M)	CAGR 93-98 (%)
Delivery Mode Total	9,265	9	10,076	11,418	13,073	14,966	17,109	19,361	14
Discrete Manufacturing	1,364	19	1,620	1,934	2,321	2,785	3,325	3,972	20
Process Manufacturing	384	12	431	492	564	646	743	849	15
Transportation	187	19	222	268	320	385	461	539	19
Utilities	576	9	629	693	761	834	918	1,004	10
Telecommunications	236	22	288	355	432	524	634	769	22
Retail Distribution	330	21	400	484	576	704	852	1,000	20
Wholesale Distribution	182	15	209	243	281	325	378	439	16
Banking and Finance	521	12	586	710	864	1,047	1,262	1,523	21
Insurance	219	9	239	269	309	361	474	527	17
Health Services	269	13	305	366	438	516	602	692	18
Education	105	15	121	140	165	200	234	269	17
Business Services	186	24	231	291	353	434	535	653	23
Federal Government	3,778	-1	3,750	4,002	4,376	4,736	5,049	5,294	7
State & Local Government	920	13	1,036	1,161	1,301	1,455	1,626	1,812	12
Miscellaneous Industries	8	13	9	10	12	14	16	19	16

The most significant change in the 1993 database reconciliation is the sharp decrease in professional services and software product results in 1992 and in forecast results for these modes in 1997. These decreases are due to the drop in DoD business in the federal government which is reflected in the federal forecast in Exhibit B-2. The drop in military-related expenditures as a result of the demise of the cold war had a greater impact on professional services and software products than on equipment. Contracts that were underway called for upgrades and new equipment which could not be cancelled. However, plans for the new federal systems were reduced so that equipment plans did not show reductions by 1997.

EXHIBIT B-3

**Systems Integration Market
1993 Database Reconciliation**

	1992 Market				1997 Market				92-97 CAGR per data 92 Rpt (%)	92-97 CAGR per data 93 Rpt (%)
	1992 Market (Forecast) (\$M)	1993 Report (Actual) (\$M)	Variance From		1992 Market (Forecast) (\$M)	1993 Report (Forecast) (\$M)	Variance From			
			1992 Forecast				1992 Forecast			
			(\$M)	(%)			(\$M)	(%)		
Total	9,170	9,265	95	1	19,530	17,109	-2,421	-12	16	13
Equipment	3,710	3,869	159	4	7,710	7,637	-73	-1	16	15
Software Products	720	685	-35	-5	1,400	1,373	-27	-2	14	15
Professional Svcs.	4,420	4,371	-49	-1	9,700	7,419	-2,281	-24	17	11
Other	320	340	20	6	720	681	-39	-5	18	15

